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ADDRESS

TO THE

ROYAL GEOGRAPHICAL SOCIETY.

Delivered at the Anniversary Meeting on the 25th May, 1863,

By Sir Roderick Impey Murchison, K.C.B.,

PRESIDENT.

Gentlemen,

In this, the Ninth Anniversary Address which I have had the privilege of delivering to the Fellows of the Royal Geographical Society, I must claim your indulgence yet more than on previous occasions, inasmuch as, besides the enlargement of our subjects of inquiry, my numerous other public avocations have prevented my devoting sufficient time to the preparation of the matter to which I have now to call your attention.

Like the noble Lord, my immediate predecessor, however, I am happily able to begin with hearty congratulations on the continuous rise in the prosperity of the Society, and the great increase of our members; albeit that the hand of death has stricken too many of our associates, and among them men of distinguished eminence.

In the Obituary, with which our Addresses always commence, I will dwell only on the character of those of our Members who were either known as geographers, or distinguished in public life, science, letters, and the arts: yet, even when so restricted, the list, I regret to say, is sad and long.

OBITUARY.

Whilst no practical or scientific British geographer of note has been taken from among ourselves since the last anniversary, we have to

condole with our allies the French on the loss of a man who, during a long life, has greatly and steadily advanced our science, and who was justly elected in our earliest days a Foreign Member of our Society. M. JOMARD, a native of Paris, was born in 1777, and at the period of his death had therefore reached the great age of eighty-five years. By pursuing in his youth those studies in physical science in which our sister country is so distinguished, he laid the foundation of that eminence which he subsequently attained. When but twenty-one years of age, he was chosen one of the corps of *savans* who accompanied General Bonaparte to Egypt; and hence it was that, in the last year of his life, he and my lamented friend the late eminent geologist Baron Cordier, who died in the same year, were the only two remaining members of that very remarkable group of men of science. Just as Jomard was vigorously occupied up to the last days of his life in promoting geography, so Baron Cordier, when aged eighty-four years, explored a large portion of the Alps on foot, and returned to Paris to resume his last lectures at the Jardin des Plantes, which he delivered with his accustomed vigour. Honour to the great soldier, who, at a moment when his countrymen had hardly emerged from the shock of a mighty Revolution, insisted on being accompanied to the classic soil of Egypt by such a scientific body-guard! For, although that expedition ended in a military disaster for France, yet, by her illustrations of the famous days of the history of Egypt, she acquired a reputation which will survive many of the glories of her warlike deeds in arms.*

To proceed, however, with the sketch of the life of the young savant who returned from the campaign in Egypt. Having by great perseverance succeeded, after years of labour, in preparing for publication the great work of his associates and himself, entitled 'Description de l'Egypte,' M. Jomard visited England after the peace in the year 1814; and, through the influence of Sir Joseph Banks and others, he obtained permission to take casts of those

* I may here say, that, notwithstanding this great example set us by the French, England totally neglected the opportunity recently offered to her in the war of the Crimea, in not attaching any men of science to the British army. In fact, when the army was leaving our shores in 1854, an earnest appeal which was made on the part of the scientific Societies of London, in which I took an active part, was rejected. It thus came to pass, that, after all its marches in Bulgaria, and long campaign in the Crimea, few or no real additions were made to our acquaintance with the physical geography, geology, or natural history of those countries. The want of a consulting geologist was indeed sorely felt at the siege of Sebastopol, when the necessity of sinking artesian wells for potable water became imminent; and then I was uselessly consulted on the subject.

great Egyptian works of art which he had admired when he thought they were destined for his own Louvre, but which the fortune of war had brought to our British Museum. Acquiring an insight whilst among us into the new system of education, that of mutual instruction, we next find him giving his first lecture at Paris on elementary education, on the very day of the battle of Waterloo! In 1818, in recompense for his antiquarian researches, he was elected a member of the Academy of Inscriptions and Belles Lettres. Successively, indeed, he became a member of nearly all the scientific Academies and Societies of Europe; but in this place and on this occasion our chief ground for honouring the memory of M. Jomard is, that, having earnestly contributed to found the Geographical Society of Paris, he was during forty-one years one of its most active and zealous members, and often acted as President or Vice-President of that body. His memory has truly another special claim upon our acknowledgments, inasmuch as he was the organizer and administrator of a new department in the National Library of France for the collection and arrangement of the maps of all nations,—a situation for which his acquaintance with many languages, and his active correspondence with geographers of other countries, singularly well fitted him.

In addition to his numerous writings on Egypt, M. Jomard has largely augmented our acquaintance with the geography of Africa by his liberal encouragement of travellers. One of the most striking proofs of this leading feature in his character was the warm manner in which he took up the cause of the poor traveller Réné Caillaud, and his efficient superintendence of the publication of a work which established the truthfulness of the journey to Timbuctoo of that poor, half-educated, yet enterprising Frenchman, who had been unjustly stigmatized as an impostor.

Rivalling the eminent Portuguese geographer, the Vicomte de Santarem, in the collection of maps and records from the earliest periods, M. Jomard brought out, entirely at his own cost, amidst various other important documents, the Map of the World by Juan de las Casas, the pilot of Columbus. During the last twelve years of his indefatigable labours, we learn from his gifted biographer M. de la Roquette, that he prepared a memoir, adopting the theory that Arabia had been the source whence the population of Egypt had been derived. Besides taking a lively interest in the construction of the canal of Suez, in the formation of the Acclimatisa-

tion Society of Paris, and in archæological researches, it is well known that, when arrested by death, he was, even at his great age, preparing a new edition of his collection of Maps, with a general Introduction.

When we look to M. Jomard's contributions to the great work, 'Description de l'Egypte,' which were thirty in number, to his notices in the 'Comptes Rendus' of the Institute, and in the 'Journal des Savans,' with his numerous writings in the Journal of the French Geographical Society, as well as to his communications to ourselves, we cannot fail to admire the untiring energy of our honoured Foreign Member. Of this venerable man I can truly say with his associate, biographer, and eminent colleague, M. de la Roquette, that his hospitable house was equally open to foreigners as to Frenchmen, and that he gave to all such a kind reception, that, whether we view him as the enlightened commentator on, and analyst of, all geographical labour, the energetic promoter of our science, or the warm and kind friend of all his associates, M. Jomard will ever be remembered as one of the true benefactors of this age.*

The late Viceroy of Egypt, SAID PASHA, had been so kind a friend to all English travellers, that when His Highness recently visited our metropolis we did honour to ourselves in electing him a Fellow of the Society. In thanking His Highness for his good will towards my countrymen, I expressed a hope that he might be able to aid Captains Speke and Grant in their efforts to discover the sources of the Nile, adding that I feared the difficulties they would have to encounter were in regions beyond his territories. "Still (replied the Pasha), I shall have it in my power to help them; for be assured that my frontiers are very elastic."

We have lost another of our Foreign Members in Dr. HAMEL, a member of the Imperial Academy of Sciences of St. Petersburg. Dr. Hamel was a man, of knowledge, ability, and great perseverance, who had travelled much, observed keenly, and was well known to men of science in most parts of Europe and America.

The Marquis of LANSDOWNE.—Of our own countrymen and Fellows of the Society who have died in the past year, I will first speak of that venerable and illustrious nobleman, the Marquis

* For a full account of M. Jomard's writings and proceedings, see the excellent sketch of him by his friend, M. de la Roquette. (Bulletin de la Société de Géographie, tome v., Février, 1863, p. 81. With a portrait.)

of Lansdowne. The demise of this venerable statesman, in the eighty-third year of his age, has justly called forth from men of all classes and of all pursuits the expression of their admiration of his enlightened, patriotic, and noble character. It is not for the President of this Society to attempt to pronounce an eulogy worthy of such a man; for that has been well done by the leading statesmen in both Houses of Parliament, whilst every section of the daily press* has vied with its fellows in bearing testimony to the truly honourable and distinguished career of the Marquis of Lansdowne.

Men of letters and the cultivators of the Fine Arts have had, indeed, to deplore the loss of one who was not only their kind and considerate patron, but who was also the accomplished judge of the merits of their works. Let us, then, as followers of a branch of science which is closely allied to historical research and literature, put in our claims to say a few words in praise of a scholar who was a lover of comparative geography, and who took as lively an interest in the well-being of our Society as if he had been one of our labouring associates.

In truth, Lord Lansdowne was endowed with so capacious a mind and such broad sympathies, that he always showed the strongest desire to extend every branch of human knowledge; and seeing before me, on this occasion, various explorers of distant lands, let me say that no mansion in our metropolis was ever more freely thrown open to any distant traveller than Lansdowne House. Nor can any such traveller ever forget the urbanity with which he was received, and the tact and happy discrimination which the noble host displayed in eliciting the knowledge of his guest.

On my own part I can testify, that when (in 1840) I first went out to explore Russia and the Ural Mountains, and compare their distant rocks with those ancient formations of my own country, the order and relations of which I had elaborated, it was Lord Lansdowne who procured for me, through the Russian Ambassador, Baron de Brunnow, those credentials, without which my labours would have been in vain. This was indeed but one of the many proofs he gave me of his kindness and regard. Consistent as a Liberal in every sense of the word, and a warm supporter of his political friends, Lord Lansdowne never neglected an opportunity of doing a service to persons of merit who were of opposite politics;

* See particularly 'The Times.'

and it was in thus giving proofs of a general spirit of benevolence that he became universally beloved and respected.

As a Trustee of the British Museum, Lord Lansdowne was for many years eminently useful in the Department of Antiquities; and his advice was always sought when a union of learning with a true feeling for ancient art was required. Nor can I forget that, when all his friends in the present Government had, as his co-Trustees, come to the conclusion that it was expedient to break up the British Museum by severing from it its Natural History contents, Lord Lansdowne then, in the last year of his valuable life, qualified his unwilling assent in a letter, expressing his regret that an adequate expenditure could not have been obtained to keep united those memorials of Art, Letters, and Science in the one great and unrivalled national repository which he had so long admired.

Lastly, as a Scotsman, I have some right to be proud when I remind you that the deceased Marquis, as well as the living Premier and the Secretary for Foreign Affairs, received an essential part of his education in the University of Edinburgh; and it must, indeed, be pleasing to all my countrymen of the north to reflect that the names of Dugald Stewart and John Playfair will go down to posterity as the instructors of a Lansdowne, a Palmerston, and a Russell.

The Right Honourable Sir George Cornewall LEWIS, Bart., M.P.—I have next to record the premature decease of my eminent friend, Sir George C. Lewis, in the fifty-eighth year of his age. Receiving his elementary education at Eton, George Cornewall Lewis took the highest classical honours at Oxford. Afterwards, and under the guidance of his accomplished father,* with whom I was long on terms of intimacy, he laid in those stores of ancient lore which in subsequent years, and when the public only knew him as a statesman, enabled him to compose abstruse works, the production of which, with ordinary men, would have been incompatible with onerous official duties. The great amount of knowledge which he had accumulated was, in truth, the result of those years of hard and patient research which preceded his being called into public life. It was this solid training which enabled him to write so many learned works, that it has been justly said of him that "he did as much in his life as twenty ordinary men, and did it well." †

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* The Right Hon. Sir T. Frankland Lewis, Bart.

† 'The Times.'

Sir George's associates in the House of Commons and in the Cabinet in which he sat, having all testified their deep sense of the loss the country has sustained in his death, it would be superfluous in the President of this Society to enlarge on the topics by which he characterised his public career, and for which he will ever be remembered by the nation; but, as one who was proud of his friendship, I must be allowed to record my personal obligations to him.

In the year 1833, or two years only after he had been called to the bar, and before he had himself published any work, young George Lewis, then residing with his excellent father at Harpton, was so much struck with the geological observations I had made in his own county of Radnor, and in the adjacent Welsh and English counties, that he urged me to gather together and condense my materials in one large work. In a subsequent year, and after I had classified and shown the order of those ancient rocks in the old British kingdom of the Silures, under the name of "Silurian," he again urged me to write a distinct work by putting together all my detached memoirs; and thus it was that, in 1835, I announced the "Silurian System" of rocks, the large work which I completed, after seven years' labour, in 1838. I need not say that this sound advice of the thoughtful young George Lewis was of inestimable value to his older friend, and has ever since been gratefully remembered.

Whoever has had the privilege of being an inmate of the house at Harpton, whether in the lifetime of that most agreeable and enlightened man, Sir Thomas Frankland Lewis, or afterwards during the happy union of our deceased Fellow with the charming and gifted lady who mourns his loss, must have been struck with the perfect cordiality and harmony in which father and son, husband and wife, lived together; leaving in the minds of all their visitors in the vale of Radnor a souvenir never to be forgotten.

In whatever aspect we view the late Sir George Cornewall Lewis, whether as the statesman around whom as a nucleus men of all parties might have rallied in a future day; as a scholar "who might have done honour as a Professor of Greek to the most learned University in Europe;"* as a son, a husband, or a friend;—all those who knew him must agree with me when I affirm, that he was as faultless a type of humanity as any man of this generation—one of

* See Dean Milman's Preface to his 3rd edition of the 'History of the Jews.'

whom it has been justly said by a great orator of the House of Commons *—

"Justissimus unus,
Qui fuit in Teucris, et servantissimus æqui."

Sir Benjamin BRODIE, Bart.—This remarkable man, for whom, in common with every one who knew him, I had the sincerest regard, was not taken from us until he had attained the highest distinction to which any man of science can aspire. Rising steadily in his profession by the exercise of a judgment at once quick, acute, and sagacious, combined with a happy operative dexterity, he became and long continued the leading surgeon of this metropolis. But, in pursuing his profession, Brodie never for a moment neglected the cultivation of other and higher branches of knowledge; and even at an early age he was admitted into the Royal Society, and contributed in that capacity several excellent memoirs on physiological subjects. He thus attracted the attention of Sir Joseph Banks, then the President of that body, obtained a high reputation as a physiologist, and with it the Copley medal.

Though for many years absorbed in active anatomical and surgical pursuits, he ever strove to advance the collateral sciences of Natural History and Chemistry; and, while he acted as President of the College of Surgeons, he was ever anxiously at work in promoting the completion of that grand and noble Museum, founded by his illustrious predecessor, John Hunter.

As he gradually withdrew from his active professional career, Sir Benjamin naturally went back to his early scientific love, and thereon his numerous friends and admirers fixed upon him as one who, by his attainments as well as by his honourable character, was eminently entitled to occupy the chair of the Royal Society. In that capacity he gave universal satisfaction by his courteous demeanour, while he had a pleasure in restoring to the Society a portion of the character it had when he entered it. In the days of Banks and Davy, men of any importance in public life, or of any considerable stake in the country, who though not scientifically qualified were yet lovers and supporters of science, were frequently admitted as Fellows. This system having been somewhat abused, and persons with no claims to distinction having been admitted by ordinary ballot, a great reform was called for; and it was decided that fifteen only of the most distinguished men among the numerous candidates were

* See Mr. Gladstone's Speech, May 4th, 1863.

thereafter to be annually selected by the Council. Although the working of this rule has been on the whole excellent, the good sense and right feeling of Brodie led him to the conviction that the plan was rather too exclusive; and hence he suggested the introduction from time to time of men of public distinction or utility, in addition to the exclusive selection of scientific workmen and authors.

As a Trustee of the British Museum, his sound advice was valuable on all occasions; and I had good reason for admiring the heartiness and independence of spirit with which he signed and afterwards personally supported an appeal to the Government, which I had drawn up, praying that the old British Museum might not be dislocated, and its Natural History contents translated to Kensington.

It is not to be forgotten that this eminent and good man served as a Vice-President and as one of the Council of our Society; for, amidst all his busy occupations, Sir Benjamin Brodie found time to cultivate and take much interest in geographical researches, and particularly in that branch of it which connects us with Ethnology. In every relation of life he was a model to be admired and imitated; and he so happily educated his son, that the present Baronet is now one of the leading scientific men of the day, and Professor of Chemistry in the University of Oxford.

The Marquis of BREADALBANE, K.T.—By the demise of the Marquis of Breadalbane I have lost a kind and valued friend, who, though he made no pretensions to science, delighted in associating himself with its cultivators. He was well versed in mineralogy, and earned the praise of naturalists by acclimatising the animals of other countries in his beautiful grounds at Taymouth, including the Llama of South America and the Bison of the American Prairies. To him also we owe the re-introduction into the Highlands of the Capercailzie, or Great Cock of the Woods.

In every sense of the word, Lord Breadalbane was a great nobleman; and whatever he resolved to do he did it thoroughly, and, if occasion required, magnificently. Having for many years served the Queen as Lord Chamberlain, he was as highly esteemed by Her Majesty and her illustrious Consort, as he was beloved by his friends for his fine social qualities; whilst his munificent Highland hospitality, whether at Taymouth, at the Black Mount, or on the Queen's birthday in London, will be long remembered by foreigners, as well as by our countrymen.

In 1840 he presided over the Meeting of the British Association

at Glasgow; and, as I then acted under him as a General Secretary, I am enabled to testify, that, under his leadership, the men of science were most effectually supported by the nobility, gentry, and all classes of the inhabitants of Scotland.

Honest, patriotic, straightforward, and highminded in his public career, he was very sincere in his private attachments. He was, indeed, so deeply affected by the loss of his accomplished wife in 1861, that from that moment he lost, and never recovered, his wonted elasticity of spirit. He died at Lausanne, in the 67th year of his age.

The Earl of GIFFORD, though not professing to be a geographer, was greatly distinguished by distant travel. Wandering far into the higher recesses of the Himalaya Mountains, and through tracts which are seldom explored by Englishmen, he underwent great suffering from intense cold. Among his contributions to Natural History, it is to be remembered, that, being an ardent sportsman and a good shot, he killed in these mountains the Kiang, one of the very rare wild asses (*Equus Kiang*, or *Asinus Hemionus*, Gray), an animal not previously seen by our naturalists, and the skull and skin of which are now in the British Museum,* while a living specimen is to be seen in the Gardens of the Zoological Society.

As a member of the House of Commons, Lord Gifford was of great use in the Dockyard Commission, the masterly Report of which was written by him, and has often been referred to in Parliament, as displaying equal ability and integrity. One of his special studies, indeed, was that of Finance; and I learn from his accomplished and devoted widow, that he left behind him an unfinished financial work, to the completion and publication of which she had looked forward with sanguine hope and pride, as

* It is also to be noted that Lord Gifford's brother, Lord William Hay, after a residence of fourteen years in the region of the Himalaya, is the person who conveyed to us the first correct intelligence concerning the fate of the traveller Adolph Schlagintweit. He also made (with the assistance of Capt. Clarke, Bengal Cavalry) the most striking photographs of many lovely scenes around Simla, including Lord Dalhousie's famous mountain-road to Thibet, as well as views of the snowy peaks of Ladak, the gorges of the Sutlej, the Valley of Kashmere, &c. The characteristic foliage of the forests of Deodora and each group of native trees, the striking and bold features of the rocks, and even the climatal conditions of warm rains and snow-clad peaks, the form of buildings, and habits of the people, are all so well brought out, that geologists, botanists, architects and engineers must unite with geographers in admiring these scenes of nature and art. It is a remarkable circumstance that four sons of the Marquis of Tweeddale should have traversed the Himalaya to the plains of Thibet, viz., the late Lord Gifford; Lord Arthur (now Lord Walden), who brought home many new species of birds; Lord William, as above; and Lord Frederick, who killed many of the wild horses mentioned in the text.

calculated to make his talents known to the world in the most useful and worthy form.

Lord Gifford was not only a good mechanic, he was also a sound mathematician and a scientific musician, having written a treatise on Counterpoint at the age of twenty. His appreciation of the Fine Arts was intense; and he had such a facility for modelling, that, if born in a humble walk of life, and not as heir to a marquisate, he unquestionably would have been eminent as a sculptor.

Dexterous in every manly exercise, he lost his life through his energy in sustaining a heavy mass of wood, from which some workmen whom he was directing had loosened their grasp, thus suddenly throwing a vast weight upon him. The inflammation occasioned by this accident led to an illness of sixteen months' duration, of which he died on the 22nd of December last, in the fortieth year of his age.

All the friends of Lord Gifford (and I am proud to have been of that number) know well, that an ingenuous simplicity was combined in him with the clearest intellect and the kindliest disposition; whilst, in addressing geographers, I can assert, that the explorers of difficult and inaccessible regions have, by his death, lost a distinguished rival.

The Earl of Ellesmere.—Six years, alas! only have elapsed since it was my painful duty to recount to this Society * the merits of my gifted friend, one of our former Presidents, the first Earl of Ellesmere. His successor, the young Earl, who has since passed away, was so infirm in health when he succeeded to his title, that a long life could scarcely be hoped for him. Though little known in public life, I am bound, however, to say of him, that he was a good scholar, a sound mathematician, and that he felt real pleasure in taking his place in the Royal Society, as well as in our own body. He also proved himself to be a son worthy of his accomplished parent as the patron of the Fine Arts, and as a great landed proprietor he sought to promote the good of all around him.

Lucas Barrett.—Geography is too intimately linked on to Geology to allow me to pass over the name of young Lucas Barrett, who, though cut off at a very early age, had already risen to distinction, and was Director of the Geological Survey of the West Indies. A pupil of Professor Sedgwick, he earned the full approbation of that eminent man by his skill as a palæontologist, and the

* See Obituary in Vol. xxviii.

able manner in which he classified and arranged the Woodwardian Museum at Cambridge. Having published several papers showing great acumen, he was, on the retirement of Mr. Wall, appointed Director of the West Indian Geological Survey. In that situation he displayed both vigour and ability, and, by his acquaintance with fossil remains, was enabled to show that the copper ores of Jamaica occurred in rocks no older than the chalk of Europe—a fact previously unknown. The Geological Map and Sections of Jamaica, which he exhibited at the late International Exhibition, and which his associate, Mr. Sawkins, and himself had prepared, were honoured with a medal. On returning to his post in Jamaica, he took with him a new diving apparatus to dredge for marine animals, and, through some maladjustment of the safety cord, he unfortunately perished when making his first trial; leaving a widow to lament the untimely end of this highly-gifted and promising young man of science.

Mr. James Robert GOWEN, who died since our last anniversary, was an intelligent Fellow of our Society. In addition to his fine temper and amiable social qualities, he had the merit of being the first of our body who recommended the employment of camels in the exploration of Australia; and, as was shown in the article on Australia in the President's Address of last year, it was by such means that the northern sea was first reached from South Australia and Victoria.

Mr. William John BURCHELL.—By the death of Mr. Burchell we have lost a venerated representative of the early race of South African travellers, as it is forty years since he undertook extended journeys into the Hottentot districts north of the Cape. He was an assiduous collector and a careful observer; and his narrative may be ranked among the classics of English travels, from its simple, vigorous, and truthful style, and its numerous illustrations, made with scrupulous fidelity on wood and stone, by his own hands.

By the decease of Mr. CHAMBERS, of Adelaide, the promotion of Australian surveys has suffered a great loss. Though not a man of science himself, he was the patron and employer of M'Douall Stuart. And if it be suggested that such an employment of our Medallist was chiefly caused by a desire to acquire new lands, may I not reply that it is by such bold and riskful methods of spending their capital—a boldness which is peculiarly characteristic of the Anglo-Saxon race—that Geography owes many a bright discovery and Commerce many a useful end? In his employment and fitting out of Stuart, and

from the manner in which he transmitted all information to this our Geographical Society, Mr. Chambers has shown much liberality, as well as his surviving partner, Mr. Finke.

Mr. Edmund Gabriel.—All those who take an interest in the suppression of the slave-trade will hear with regret of the death of Mr. Gabriel, Her Majesty's Judge in the Mixed Commission Court at St. Paul de Loanda, West Coast of Africa. Mr. Gabriel had been connected with that coast for many years, and was perhaps as instrumental as any man of his time in putting down the nefarious traffic. The son of a naval officer, Mr. Gabriel entered his father's profession at an early age, and served for seven years in the African squadron, twice filling the position of Secretary to the Commander-in-Chief on the station. In this capacity he acquired a perfect knowledge of the slave-trade in all its bearings. Early in 1845, his distinguished talents and zeal brought him under the notice of the late Earl of Aberdeen, then Foreign Minister, who selected him to fill, at the early age of twenty-one, the important post of Arbitrator and Acting Judge at Loanda. His energetic administration of this office was appreciated by the Liverpool merchants, who tendered for his acceptance a costly piece of plate, as an acknowledgment of his efforts for the protection of British shipping; but Mr. Gabriel, with his characteristic high-mindedness and delicacy, declined the valuable gift, remarking that he had only done his duty, and that it was not consistent with the office of a Judge to accept a present. Another very characteristic circumstance is recorded of him in Dr. Livingstone's well-known volume. When that great explorer, having crossed the African continent, reached Loanda in May, 1854, worn out by fatigue and sickness, he presented himself without introduction at the hospitable door of Mr. Gabriel, who immediately gave up his own bed to the sick and unknown stranger. Dr. Livingstone bears grateful testimony to the generous kindness of this "genuine, whole-hearted Englishman," in whose house he and his twenty Makololos found a home for many months.

In urging on the House of Lords (1861) the desirableness of reappointing a Consul at Mozambique, with a view to the suppression of the slave-trade on the east coast of Africa, Lord Campbell passed a well-merited eulogy on the character of our deceased associate, Mr. Gabriel, pointing him out as the man of all others most capable of checking the slave-trade in that foreign colony. It was on that occasion said of him, with justice, in reference to his career at Loando, that, "during a period of fifteen years, the volumes on

the slave-trade abound with proofs of his tact, judgment, public spirit, and intelligence."

We have only to add that Mr. Gabriel eventually fell a victim to the deadly influences of the climate, operating on a constitution impaired by the hard work of seventeen years. He died on board H.M.S. *Torch*, having gone afloat in the hope of recovering his health. After his death the vessel returned to Loanda, where his remains received the honours of a public funeral; the Viceroy, and other foreign authorities, with the inhabitants of the place, joining with his own countrymen in this mark of regard, the universal sentiment being one of deep sorrow for his early death.

Among the other Fellows of the Society who have passed away, I must mention, as personal friends whose loss I lament, Mr. James Walker, F.R.S., the eminent and well known Civil Engineer, whose valuable labours will be recorded in the proceedings of other societies; Mr. Antony St. Leger, an accomplished and most agreeable gentleman; and the amiable Mr. Walter Ewer, a skilful Orientalist and civil functionary of our Indian Administration.

The remainder of the mournful list is made up of the names of Mr. David Barclay; Mr. George Smith Brent; Mr. John Costerton; Major-General John Fraser; Lieutenant-Colonel C. Fagan; Mr. George March Harrison; Mr. W. Jackson; Mr. Charles Hammersley; Mr. E. B. Lawrence; Captain Liardet, R.N.; Mr. H. Tanner, of Philadelphia; Mr. Francis Nares; Vice-Admiral A. Vidal (a distinguished officer); and the coloured Missionary, Mr. Hanson. The last-mentioned of these addressed us on African subjects in relation to the slave-trade and the new settlement at Liberia, with much feeling, and in good and racy English.

Mr. WHEELER, our first clerk, who died recently, was a great loss to the Society, and many of our Members have very properly subscribed to assist his widow and young children.

The different subjects of the Address which follow will be given in much the same order as in previous years. Beginning with the Admiralty Surveys, as furnished by our esteemed associate Admiral Washington, the Hydrographer, and succeeded by the national Topographical and Geological Surveys, the account of the progress of exploration in Africa and Australia will form the main features of this discourse. Brief sketches of the progress of Geography in

Germany, more particularly as gathered from the publications in the 'Mittheilungen' of Petermann, will be followed by observations on the present and former conditions of the northern regions of Europe, to show the intimate connexion between geological and geographical science.

Commenting very briefly on a few publications of books and maps in our own country, analyses of the progress of researches in Asia, Australia, and Africa will then be given, deferring to the ensuing Anniversary any observations on the advance of our science in Russia and America. On this occasion I will conclude with a few observations on the changes which have just taken place in the administration of our affairs.

Admiralty Surveys.

The Coast Surveys in course of execution under the orders of the Admiralty, both at home and abroad, have made the usual progress during the past year. They are conducted by twenty different parties: one-half of which are employed in the United Kingdom; the remainder in the colonies of Australia, Cape of Good Hope, West Indies, Nova Scotia, Newfoundland, and Vancouver, and also on the foreign coasts of Syria, Saloniki, China, and Japan.

The British Isles. England.—The Coast Survey of the British Isles is nearly complete; but from the nature of the shores, particularly on the east coast of England, in the estuaries of the Humber and Thames, in Yarmouth Roads, the Downs, and other places subject to the accumulation of sands, changes will ever be taking place that will require watching and re-examination.

The South Devon Survey has been brought to a close, under Capt. Stokes, R.N.; and the re-examination of the Scilly Isles, by Capt. Williams, R.N., and of the Channel Islands, by Mr. Richards, R.N., is proceeding steadily. In the latter group, so beset with rocks and hidden dangers, a very critical search is required; and the careful system carried out by Mr. Richards has been rewarded by the detection of several shoals that had escaped the cursory method of previous surveys.

In South Wales, Commander Aldridge and staff have surveyed 40 miles of coast-line, besides 20 miles of sward or marsh outline, together with about 100 miles of low-water feature, and 108 square miles of soundings.

Mr. Calver, R.N., and party have finished the upper Humber, and re-surveyed a considerable portion (120 square miles) of the southern

entrance of the Thames. They were also engaged in making a series of observations on the tidal streams off Dover, with a view to assist the solution of the much-contested problem of the locality of Julius Cæsar's landing on our shores.

Mr. Scott Taylor, R.N., has continued his delineation of the several changes in progress in the vicinity of Portsmouth and the Isle of Wight.

Scotland.—Captain Otter and his assistants have been engaged in the survey of the islands of South Uist, Canna, and Rum, and have sounded over an area of 1182 square miles. Commander Thomas has continued his survey of the intricate shores of Benbecula and Harris, of which he has delineated 113 miles of the labyrinthine shores occupying a comparatively small area, and has sounded 246 linear miles in boats; while Commander A. G. Edye has surveyed 62 miles of the exposed islands of Barra, Muldoanich, Flodday, Pabbay, &c., as also the dangerous submerged rocks adjacent.

Commander (now Captain) E. J. Bedford and staff have surveyed 97 miles of the coast line of Lochs Linnhe, Leven, Etive, and Iel, and 107 square miles of adjacent topography, together with 194 linear miles of soundings.

Ireland.—Messrs. Hoskyn and Davis, R.N., were employed during a portion of the season in obtaining deep-sea soundings off the Western coast in H.M.S. *Porcupine*, for the purpose of determining the best route for the electric cable to America, should that gigantic and much-to-be-desired enterprise be again attempted; and which the indomitable energy and perseverance of English and American capitalists and engineers will doubtless undertake and accomplish; either by the direct route from Ireland to America, or by the more circuitous connexion of Færöe, Iceland, Greenland, and Labrador. This examination of the bed of the Atlantic to a distance of about 200 miles from the coast, has revealed some remarkable irregularities of contour; and among them is that of the Porcupine Bank, having a depth of only 82 fathoms at a distance of 130 miles west of Slyne Head. A line of soundings was also carried to the extensive and prolific, but, as appears from recent accounts, very uncertain fishing-bank, from which rises the remarkable and almost inaccessible lump of granitic gneiss, "Rockall," to a height of 70 feet above the level of the sea, where its base is only about 250 feet in circumference. (Lat.: 57° 35′ 53″ N., 13° 42′ 21″ W.) Mr. Hoskyn's survey has added some interesting facts in microscopic life, and also some species of shells and other animals new to British Fauna.

Mediterranean.—Captain Spratt, R.N., with his staff, in the *Medina*, have during the past year completed an admirable survey of the Maltese Islands, with their surrounding depths. This has been charted on a scale of 1¼ inch to a nautic mile, and is already in the engraver's hands. They have also delineated the shores of the Gulf of Saloniki, and obtained lines of deep-sea soundings through the Archipelago. Elaborate surveys have also been made of French Creek, and portions of Grand Harbour, Malta, on a scale of 60 inches to the mile, for engineering and other special purposes.

Commander Mansell and his staff, in the *Firefly*, have completed the coast of Syria, forming a junction at El Arish with his previous survey of the coast of Egypt. An extensive triangulation has been carried across the mountain ranges, by which the connexion of Damascus, and the chief points of interest along the valley of the Jordan, with the shores of the Mediterranean have now been accurately established. Commander Mansell has now commenced the re-examination of the channels of Corfu, which is much required.

Africa.—In the Cape Colony Mr. Francis Skead, R.N., has made a survey of Mossel Bay and adjacent coast, on a scale of 4 inches to a nautical mile, and has extended his triangulation for future observations.

Asia.—Along the Mekran coast of Persia, Lieut. A. W. Chitty, I.N., has closely sounded between Ras Jáshk and Ras Gwadel to distances varying from 10 to 20 miles from the shore, where the depths are from 200 to 400 fathoms.

Lieut. Stiffe, I.N., also obtained some additional soundings in the Persian Gulf, and examined various portions of the coast to determine the best stations for the telegraph-line which is to connect this country with our Indian empire, by route of Constantinople, Bagdad, and the Persian Gulf.

A plan of Bushire, by Commander C. G. Constable and Lieut. A. W. Stiffe, I.N., has recently been published by the Admiralty, on a scale of 3 inches to the mile.

China and Japan.—In the course of the preceding year H.M. ships *Rifleman* and *Swallow* left England for the survey of the China and Japan Seas. Mr. John W. Reed, Master, R.N. (commanding the *Rifleman*), and his staff, have already transmitted a good instalment of work, in the surveys of the Tambelan and St. Esprit groups, and the surrounding islets and rocks lying between Singapore Straits and Borneo. Meridian distances have been run between these islands, Singapore, Saigon River, and Pulo Condore; Charlotte

Bank examined and its position accurately determined; while the reported shoal Capiolani, lying (as well as Charlotte Bank) directly in the route between Singapore and Hong-kong, was sought for in vain. From evidence obtained relative to this supposed danger, it seems more than probable that the captain of the *Capiolani* was deceived in what he saw. The next work of the *Rifleman* will be the survey of Pulo Sapato, Catwick, and the several dangers lying to the south-east of Cochin China, in the high road of commerce, and from thence proceed to explore and define the numerous reefs that stud the China Sea between those and the coasts of Borneo and Palawan, one-half of which, as they appear on charts, are probably fabulous, so that the importance of establishing the really existing ones in this much-frequented route cannot be overestimated.

Mr. Edward Wilds, Master, commanding the *Swallow*, with his staff, have carried meridian distances to Singapore, to Pulo Condore, Sapato, Hong-kong, and Shang-hai, and resurveyed the shallows of Wu-sung River, leading to the last-named place. The *Swallow* is now engaged in the Japan Sea.

During the season of 1861 H.M. ships *Actæon* and *Dove*, Commander Ward and Lieut. (now Commander) Bullock, R.N., were given the assistance of the *Leven* and *Algerine* gun-vessels, in their surveying operations in Japan, by order of Sir James Hope, K.C.B., the Naval Commander-in-Chief on that station.

The approaches to Yedo, extending from Cape Idzee to Cape King, an extent of 150 miles, and embracing the Bay of Wodewara and the Gulf of Yedo, have been surveyed on a scale of 1 inch to the mile, and a chart of the latter, including the joint work of American, Prussian and Dutch surveyors, has been published on the same scale. The chain of islands, extending about 3° south of the Gulf, has also been partially explored as far as Tatsizio, a large island which is said to be a penal settlement, and inaccessible except at one spot. Additional observations were made on the Kuro-Siwo, or Gulf-stream of Japan, which has been here found to recurve to the southward in the summer months, contrary to the generally received opinion.

At Yedo a manuscript survey of the empire, on a scale of 10 inches to a degree, was obtained from the Government through the instrumentality of Sir Rutherford Alcock, K.C.B., our minister in Japan. This acquisition is valuable not only as a correct map (for wherever tested it has been found to be both trigonometrically and astronomically accurate to a remarkable degree, although graduated

in a peculiar and original manner), but also as a work of art, illustrating the advanced stage attained by this extraordinary people in surveying, which will compare favourably with specimens of our own, published in the beginning of the present century. From this manuscript a new general chart of Japan has been published, on a scale of 2 inches to a degree of longitude, also a chart of the inland sea of Japan, on the scale of the manuscript, with soundings obtained by several of H.M. ships, by which, at the cost of a few days, an intricate labyrinth of rocks and islands is made plain to navigators, which otherwise would have occupied the surveying party a year. The approaches to this sea, embracing about 220 miles of coast-line, have been surveyed by Captain Ward and his staff, on a scale of 1 inch to the mile, and plans of several harbours on the shores of the Eastern or Kü Channel, on the 3-inch scale.

A new survey has also been made of the important harbour of Nagasaki, with that of the adjacent coast as far as Cape Nomo. All of which are in course of publication. The eastern sound of Tsusima and the southern part of the island have also been surveyed; whilst the northern portion of the hitherto unexplored arms of Tsusima Sound have been executed by the Russians, who have also roughly charted the island of Iki.

The depth of the Korea Strait has been ascertained, and the southern part of the Goto Islands surveyed, where a fine harbour, called Tama-no-ura, has been discovered. Also a portion of the Korean Archipelago and coast opposite Tsu-sima, has been explored, by which it is thrown 20 miles to the westward of its assigned place on the chart.

A track survey, by Lieutenant Bullock in the *Dove*, was made of 100 miles of the south coast of the province of Shan-tung in China, from the parallel of 36° 40′ N. to within 60 miles of the old entrance of the Yellow River, which is now reported, with scarcely any doubt, to discharge itself into the Gulf of Pechili by the Ta-tsing-ho, a river known to have been gradually increasing its volume for three or four years. By the destruction of the vast embankments that had confined it to its southern channel, this river has resumed the old course in which it had previously flowed (though with frequent fluctuations) for centuries; thus realizing the prediction of Mons. Biot, made twenty years ago. Off the now dry southern mouth of the Hwang-Ho, its sands were found to stretch seaward 100 miles, rendering it dangerous for large ships to approach the coast even at this great distance.

The question of the geographical distribution of species has been advanced by the valuable collections and observations made by the expert naturalist Arthur Adams, F.L.S., who was Surgeon of the *Actæon*. Mr. James H. Kerr, Master, R.N., with Messrs. Adlam and Dowdale, R.N., were detached from H.M.S. *Actæon* to survey the western branches of Canton River, of which they delineated upwards of 200 miles.

Australia.—The Australian Surveys, at the joint expense of the Admiralty and the Colonies, are progressing steadily; Commander Cox, R.N., and staff have nearly completed that of the noble inlet of Port Phillip, on a scale of 6 inches to a mile, a portion of which is now being engraved on the 1-inch scale.

Commander Hutchinson, R.N., and party have transmitted their survey of the upper inlet of Spencer's Gulf leading to Port Augusta (embracing about 100 miles of coast line), on a scale of 3 inches, with a plan of the port on 9 inches to a mile; a reduction of which will shortly be published; while their chart of the mining district of Wallaroo and Tipara Bays has already been issued.

Commander Sidney, in New South Wales, has transmitted home 50 miles of coast between Crowdy Head and Sugar Loaf Point, and also corrected the chart of Newcastle Harbour to its present condition.

Mr. Jeffery, R.N., who went out at a later period to the survey of the coast of Queensland, is engaged in the survey of the channel within Great Sandy Island.

In Tasmania Lieutenant Brooker, R.N. has made a survey of the Port of Hobart Town, which has been published on a scale of 10 inches to a mile; and also of George's Bay, on the east coast; but we regret to state that his further progress has been cut short in consequence of the finances of the colony being for the time incapable of bearing the moiety of the expense which it had agreed to share with the Admiralty.

Vancouver Island.—Through the indefatigable exertions of Captain G. H. Richards, R.N., and his staff in H.M.S. *Hecate*, the entire survey of this extensive island has now been completed, together with the strait separating it from British Columbia, with most of the inlets that deeply indent the latter. Captain Richards is now returning home, but has organized a party who remain behind to continue the exploration of the coast of British Columbia. A series of eight charts, on the scale of ½ an inch to a mile, will embrace the entire coast of Vancouver; half of which, together with several

enlarged plans of harbours, have already been published. Much credit is due to those who have effected the able and rapid execution of this highly useful survey.

Newfoundland.—The survey of this island, on a scale and system corresponding with the requirements of the present age, is proceeding steadily under Captain John Orlebar, R.N. and staff. The portions of the coast of Trinity Bay lying between Catalina Head and Horse Chops on the west side, and between Baccalieu Island and New Perlican on the east side; also in Conception Bay from Baccalieu to Carbonière, and from Portugal Cove to Cape St. Francis, and thence to Cape Spear, together with Bell and Kelly Islands, have been surveyed on the scale of ½ an inch to the mile, while plans of Catalina, New Perlican, Harbour Grace, and St. John Harbours have been plotted on 3 inches to the mile. On the south coast the Bay of St. Mary, and the harbours within it, have been completed, altogether embracing 370 miles of coast line, added to which upwards of 2000 square miles have been sounded, extending eastward from the coast to the meridian of 50° West. The explorations in Trinity and Conception Bays, and the examination of the sea-bed in their approaches, were made more especially to determine the best point for landing the American end of the Great Atlantic Telegraph, which, it is to be hoped, will ere long connect that country with Great Britain and Europe; and Captain Orlebar has reported that New Perlican, on the eastern side of Trinity Bay, seems to be best adapted for this purpose. For the laying of the first cable you may remember that Bull Bay, in the south-west angle of Trinity Bay, was the place selected for its western terminus.

Nova Scotia and Bay of Fundy.—Captain P. Shortland, R.N., with his staff, have mapped 162 miles of the south-east coast of Nova Scotia, on a scale of 4 inches to a mile, and sounded over an area of 282 square miles. Charts of the upper portion of the Bay of Fundy, embracing the Basin of Mines, and the Petitcondiac River and Cumberland Basin, as also of the south-east coast of Nova Scotia from Baccaro Point to Rugged Island, are about to be issued to the public.

West Indies.—The surveying party under Mr. John Parsons, Master, R.N., have completed about 70 miles of coast line of the Grenadines, St. Lucia and St. Vincent, and elaborately and closely sounded over 180 square miles. Plans of Admiralty Bay, in Bequia Island, and Kingston Bay, in St. Vincent, have been made on a scale of 20 inches to a mile, and of Castries Port in Santa Lucia on

15 inches, and very thickly sounded. Mr. Parsons is now engaged in an elaborate survey of Falmouth Harbour, Antigua, on a scale of 30 inches; this port having been selected as a packet station for the West India line.

Besides the works here described as in progress in the different parts of the world, the labours of the Hydrographic Office during the past year have consisted of the publication of 65 new charts, with material additions and corrections to many others, under the immediate superintendence of Captain George A. Bedford, R.N. It will give some idea of the activity of the business of this office when I state that 138,503 Admiralty Charts have been printed during the year ending 30th April. There have also been published the usual Tide Tables for 2500 places, by J. Burdwood, Esq., R.N., the Light Lists for every coast by Commander E. Dunsterville, R.N., together with Hydrographic notices of new lights, rocks, and shoals discovered, and other information essential to navigation in general.

ORDNANCE SURVEY.—I learn from my friend Colonel Sir Henry James, under whom this important branch of national scientific labour is so efficiently conducted, that the survey of Northumberland and Cumberland has been finished within the last year, and the plans of those counties are now in course of publication. By this operation the survey of England and Wales is nearly completed as relates to the one-inch map of the whole country. The survey of the six northern counties, viz. Northumberland, Cumberland, Westmorland, Durham, Yorkshire, and Lancashire is almost completed, on the twenty-five and six-inch scales. The plans of these counties so useful to proprietors, have been made as *cadastral surveys*,* the universally received name for plans on a large scale strictly accurate in all respects.

The survey of these counties having been on the eve of completion, a Select Committee of the House of Commons, of which Viscount Bury was Chairman, was appointed last session to report upon "the expediency of extending the Cadastral Survey over the southern portions of the United Kingdom that have been surveyed upon the scale of one inch to the mile only;" † and this Committee having reported "That it is desirable that the Cadastral Survey, on

* From the French "cadastre," survey.

† Whilst such are the facts, I must repeat the expression of my hope that these surveys on the large scale will not be applied to the wild and mountainous regions of the Highlands; a one-inch map of which is all that can be desired, whether for proprietors, engineers, or geographers.

the scales directed by the Treasury Minute of the 18th May, 1855, and recommended by the Royal Commission of 1858, and again directed by the Treasury Minute of the 11th September, 1858, be extended to those portions of the United Kingdom which have been surveyed on the scale of one-inch to the mile only." In consequence of this recommendation, a Treasury Minute of the 18th March, 1863, has been issued, directing that arrangements should now be made for carrying this recommendation into effect, and the measure has since received the sanction of Parliament. We shall therefore have a complete cadastral survey of the United Kingdom: that of the whole of Ireland having been already published on the six-inch scale, that of Scotland having been finished from the southern border so far north as to include the whole of Perthshire, parts of Kincardineshire and Argyleshire, and the survey is now proceeding in the two latter counties and in Aberdeenshire. The six northern counties of England have also, as before stated, been surveyed for the twenty-five and six-inch scales; and by the foresight of the late Lord Herbert the military surveys along the valley of the Thames from Kingston to below Sheerness, of large districts round Portsmouth, Devonport, Pembroke, Dover, and other places, were made as parts of a complete cadastral survey of the counties in which those places are situated. In consequence of this arrangement, a great number of the plans are already finished, and the publication of them is now in progress.

A complete catalogue, in three parts, of all the maps, plans, and works published by the Ordnance Survey Department relating to England, Ireland, and Scotland, will be found in the library of the Society; and this catalogue will be reprinted and issued quarterly.

The account of the extension of the triangulation of the United Kingdom through France into Belgium has been published within the last year; the Belgian geometricians are connecting their triangulation with that of Prussia, and the Prussian geometricians are connecting their work with that of Russia, whilst the Russians are extending their surveys as far as Ursk on the river Ural; and M. Otto Struve states that he hopes to have this portion of the work finished next year. We shall then have the data for computing the length of an arc of parallel in latitude 52° N. from Valentia in the west of Ireland to Ursk, extending over nearly 75 degrees of longitude.

In order that the lengths of the computed sides of the triangles in each country and the whole length of the arc should be accurately given in terms of a common unit of measure, a rigorous

comparison must be made between the standard of length used in each country for the measurement of their respective bases, and this comparison is now being made at the Ordnance Survey Office, Southampton. The difference in the computed lengths of the sides in our extended triangulation and the lengths as computed by the Belgian engineers is less than one foot in 10 miles, or less than the $\frac{1}{52800}$ part, but this result may be modified when the standards of length are compared.

The whole of the volume called 'Great Domesday Book' has been copied at the Ordnance Survey Office by the photo-zincographic process applied by Sir Henry James, and the second volume called 'Little Domesday Book,' containing most minute entries respecting the counties of Essex, Norfolk and Suffolk, is now being published; and it is in contemplation to add to these volumes maps of each separate county, showing the position of the several manors mentioned in Domesday Book, with the names by which they were known in the time of the Conqueror and their modern names.

The art of photo-zincography has been greatly advanced within the last few months; for whilst it was previously confined to the production of copies of existing documents, such as MSS., printed works, and line engravings, it is now employed at the Ordnance Survey Office for the production of copies of photographs in permanent ink, and at a very trifling expense. This art is therefore likely to prove of the greatest advantage to travellers, as photographs can now be sent or brought home, and prints to illustrate the account of their travels struck off from zinc plates or stone in any number that may be required.

GEOLOGICAL SURVEY OF THE UNITED KINGDOM.—The report of the last year's progress, which it has been my duty to make as Director-General of this establishment, contrasts favourably with that of the preceding year. Thus, the survey of Great Britain, under the management of Professor Ramsay, has extended over the Wealden country of Kent and Sussex and various midland counties, and has been extended northwards into Staffordshire, Derbyshire, Cheshire, and Lancashire. Again, sheets on the six-inch scale have been published of the last-mentioned county to show in detail the "faults" and complications of the coal-fields. Maps and sections on the same large scale have been finished in illustration of the carboniferous rocks of Scotland. The sale of all these maps has greatly increased.

The survey of Ireland under Mr. J. B. Jukes has also made good progress in the following counties—Queen's, King's, Clare, Galway, Longford, and Westmeath. The published sheets of the map now amount to 93 out of the 205 sheets into which Ireland is divided.

On the affiliated branches of this establishment, which it is my province to direct, it is unnecessary that I should dilate in a geographical discourse. I may, however, say with some pride, that the eminent professors of the Royal School of Mines have educated many promising youths in chemistry, metallurgy, physics, mechanics, and natural history, as well as in geology, mining, and mineralogy. The Mining Record Office, also an integral part of our system, and which is zealously conducted by Mr. Robert Hunt, has proved most serviceable to the Houses of Parliament and the nation in registering the mineral produce of the kingdom. These documents are not only important to the mining, commercial, and manufacturing interests of the country, but are highly appreciated by all foreign statists. Restricting my observations to the Geological Survey only, and the publication of our maps, it has naturally been a subject of great satisfaction to myself, that our labours should have been highly esteemed by geographers and geologists of all nations who attended the late International Exhibition. I may, indeed, particularly cite the opinion of M. Sella, a sound mathematician, and recently Minister of Finance of the kingdom of Italy, who having been officially employed to visit the mining schools and geological surveys of various countries, with a view to the application of the best system to Italy, thus reports upon the operations of our British survey:—"England is, without doubt, the country where geological maps are prepared with much greater accuracy than in any other land. The singular importance of her mining industries, the spread of the elementary principles of geology, the zeal of the geologists charged with these labours, and the precision of their works have been so carried out, that few undertakings of the British Government have so much contributed to the benefit of the public as the Geological Survey of the United Kingdom."

Recent British Publications.—I must defer till next Anniversary, notice of the recently published works. I may, however, notice 'The Introductory Text Book of Physical Geography' of Mr. David Page, as being most useful to young geographers, and scarcely of less value to many of my older associates, in bringing before them

in a clear and condensed form all the leading elements of geographical science.

For the small price of two shillings, any Fellow of our Society can provide himself with a copy of this work, which, illustrated by many diagrams, conveys to the student and brings back to the mind of the proficient all the chief data, whether astronomical, geological, or meteorological, by which the outlines of the crust of the earth are determined. The author has, indeed, particularly pleased me by showing that the changes of land and water can only be well understood by the explanations which geological researches have revealed. In addition to a clear sketch of the effects of climatological influences, he points out the nature of the distribution of plants and the lower animals, and also describes the races and varieties of man, and his advancement through the means of civilisation and culture.

In short, by the manner in which he connects Geography with Ethnology, Mr. Page affords the best possible reason for the union of these sciences; and, as it fell to my lot to bring about that union in one of the Sections of the great national meeting of the British Association,* so I am the more gratified in perceiving that Mr. Page has based these, the last arrangements of matter and life on the surface of our planet, on their true foundations, and has thus connected them with the numerous previous changes which the earth has undergone.

I also refer my associates with much satisfaction to a still smaller, but not less important work in awakening the mind to the harmonious adjustments of Nature. In his Essay on 'The Correlation of the Natural History Sciences'† Professor Ansted has eloquently and clearly shown, in 50 small pages, that Physical Geography, General Physics, Chemistry, Astronomy, Zoology, Botany, and Geology are all correlative—all demonstrative of the marvellous unity of design of the Creator.

In reference to the maps recently published in the British Isles, I must also defer any comment on them to the ensuing Anniversary.

Geographical Publications in Germany.—The zeal with which geographical works, not merely relating to their own country but to the world at large, are issued by Germans is truly remarkable. I

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* The Geographical and Ethnological Section.

† MacMillan and Co. 1863. Price 1s.

cannot now pretend to notice the very numerous publications and maps which have issued from Vienna, Berlin, and the smaller cities of Germany. Of the latter, however, Gotha has been rendered so celebrated by the 'Mittheilungen' of Justus Perthes, so ably edited by Augustus Petermann, and so extensively circulated through Europe, that I deem it to be highly useful for geographers to have thus placed before them (as below)* a list of the

* The following are some of the original papers contained in the 'Mittheilungen' for 1862-63:—

EUROPE.—*E. v. Sydow*, Report on the Progress of the great National Surveys of the European States in 1861 and 1862 in particular, and of recently published maps in general. *A. Petermann*, on the English Admiralty Survey of the Western Coast and Islands of Scotland (with map). *A. Petermann*, on the Cartography of Denmark and the Duchies, and her Colonies in Iceland, Greenland, Færöe, and the West Indies (with map). *General Blaramberg*, Director of the Imperial Russian Ordnance Office, Cartography of Russia in 1862. *General Chodzko*, the Russian Surveys in the Caucasus. *Captain Iwashintsoff*, Russian Survey of the Caspian Sea (with map, showing the soundings by blue tints, from 100 to 100 sashen, and representing two great depressions of the sea-bottom of upwards of 400 sagenes); Measurement of the Arc of the Meridian between Palermo and Christiania. *L. v. Babo*, on the Wine-Growing Districts of Germany, and the characteristic features of the different kinds produced. *Professor Rogg*, physico-geographical essay on the Basin of the Boden-See. *Lieut.-Colonel Sonklar*, the Alpine Group of the Hohen Tauern. *Coaz*, the Alpine Passes of Graubünden, and the Railway between Switzerland and Italy. *Dr. A. Ficker*, the New Administrative Division of Austria (with map). *J. Schmidt*, Director of the Observatory at Athens, Travels in Greece, and Hypsometric Measurements. *V. Baer*, the project of the Manytsh Canal. *Magister v. Seidlitz*, Journeys in the Caucasus, 1862.

ASIA.—*Berghaus*, the Present and Future Lines of Communication between Europe and India. *Dr. Th. Kotschy*, Journey to Cyprus and Asia Minor, 1859. *Dr. O. Blau*, Journey in Asia Minor and Kurdistan, 1857; and on the Orthography and Meaning of Turkish Names of Places in Asia Minor. *Dr. A. Schläfti*, Ethnography of Kurdistan and Mesopotamia; and the Political Condition of the countries round the Persian Gulf. *Julius*, Survey of *Captain Selby* and *Lieut. Collingwood* of Lower Mesopotamia, by order of the Bombay Government (with map). *Maximovilsth*, Journey on the River Sungari, in Mantchooria, 1859. *Chalmers* and *Hawk*, Journey on the Tong-kiang or East Canton River, 1861. *F. v. Richthofen*, Journey in Siam and Pegu, 1862.

AFRICA.—*A. Petermann*, Map of the Interior of Africa, in 10 sheets. (This map extends from Cairo in the north to Kazeh and Lake Tanganyika in the south, and from Karthum on the east to Lake Tsad on the west; it has been constructed with great care and labour from published as well as manuscript materials: hundreds of works and papers having, I understand, been consulted. Of this extensive work, 8 sheets are now published, accompanied by seven memoirs, which have been selected from among the unpublished materials consulted in constructing the map. These are *M. v. Beurmann's* Journey through the Nubian Desert, 1860; *Dr. Th. Kotschy's* Journey in Kordofan, 1839; *Brun Rollet's* Journey in the Marshy Regions of the Bahr el Abiad and Bahr el Gazal, 1856; *Dr. E. Behm*, the Eastern Portion of the Desert of Sahara, including the Country of the Tebu; *M. v. Beurmann's* Journey from Bengazi to Murzuk, 1862; *Marquis O. Antinori's* Journey from the Bahr el Gazal to the Country of Djur, 1860-61; and *M. v. Beurmann's* Journey from Murzuk to the East into the country of the Tebu, 1862. The two last sheets, 8 and 9, are in the press, with an original paper by *Heuglin*, on the Upper Blue Nile and its Tributaries; as well as a memoir by the Missionary *Mortang* on his journeys to the East and West of Gondokoro, 1859.)

I further learn from Mr. Petermann that reports have been made on the journeys and observations of Messrs. Heuglin, Heudner, Kinzelbach, and Munzinger, in the regions of Eastern and Inner Africa, extending from Juakin in the North, southwards through Abyssinia to near the 10° of N. lat., and from Massuah in the East to Kartum and El Obeid in the West. (Eight valuable maps of this region, with astronomical positions and observations

various papers and maps issued by that establishment in the past year. In addition to this copious list, I must call attention to a new edition of 'Stieler's Atlas,' in 80 sheets, which Petermann is engraving on copper, in order to render them more clear and distinct than any lithographic map can be made. The specimens of these sheets which I have received, illustrative of Great Britain and Ireland, Denmark and her Colonies, Upper Italy, Australia, West Australia, Tasmania, and New Zealand, are much to be commended. Supplementary to Stieler's Atlas, our indefatigable German associate is preparing a still larger series of 300 sheets. His idea is to supply in full and careful delineation all those details which are inadequately represented, and on too small a scale, in most existing Atlases. Thus Australia will be represented in 25 sheets. Another and well-executed map of Petermann's is the Geological Map of the Province of Auckland, in New Zealand, as prepared on the spot by my distinguished friend, Dr. Hochstetter, of the Austrian *Novara* expedition. This author has just published a beautifully illustrated work entitled 'Neu Seeland,' which I commend to the attention of geologists and naturalists as well as to geographers.

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of altitude, have been received from these travellers, and are being prepared for publication in the 'Mittheilungen.') The other communications relating to Africa, are *M. v. Beurmann's* Journeys in Nubia and Soudan, 1860 and 1861. *Dr. A. Roscher's* Notes of his Journey from Zanzibar to the River Lufiji, 1859. *Baron von der Decken's* and *Dr. Kerschen's* Second Journey to Kilimanjaro, 1862, in which they ascended that peak to the height of 13,000 feet, and encamped in the snow. A memoir on the Exploration of the Gaboon Country, by *P. Du Chaillu* and others (with map); the River Systems of the Niger, Benue, Calabar and Cameroon (with very detailed map, showing the routes of all European travellers and native itineraries); on the Present State of Geographical Knowledge of Congo and Angola, a careful digest of the oldest as well as most recent authorities, including MSS. documents (with detailed map).

AUSTRALIA AND POLYNESIA.—Besides the illustration of the Expeditions of Stuart, Burke, F. Gregory, McKinlay, &c., as illustrated by four maps which have recently been brought out in one clear compendious map, the principal original papers have been those by *F. v. Hochstetter* of his Journeys and Observations in New Zealand. Of this traveller four papers have been given, illustrated by four maps, viz., one general map of New Zealand, a topographical map of the Isthmus of Auckland, and two geological maps of the province of Nelson and of the region of Roto Mahana, with its hot springs. Also, papers on the Guano Islands of the Pacific and the Islands to the East of New Guinea, by the Italian missionary, D. Carlo Salerio.

AMERICA.—Reichel's Observations on Labrador and the Missionary Stations there (with two maps of the country round Okak and Nain, from his observations). *Dr. H. Berendt's* Observations on Mexico. *Dr. Moritz Wagner* (three papers): Volcanoes of Central America; Exploration of the Interior of the Isthmus of San Blas, east of Panama (with map); and Province of Chiriqui (with detailed map). *Dr. A. v. Frantzius*, Costarica. *A. Keppler*, Expedition of the Dutch and French into the Interior of Guiana, 1861. *J. J. v. Tschudi*, Brazilian Province of Minas Geraes (with large map by Halfeld, from the official surveys in 1836-1855). *Burmeister*, Artesian Wells at Buenos Ayres.

POLAR REGIONS.—The Swedish Expedition to Spitzbergen, 1861, in which *M. Forell* has added many new and important geological data, has likewise been well illustrated.

Having mentioned that expedition, I have much pleasure in requesting my hearers to peruse the third volume of the work of Dr. Scherzer, which gives in very clear and attractive style the historical narrative of that survey. When all the details which were collected by the physicists and naturalists of that memorable scientific expedition shall be published, Austria will doubtless receive the praise which is due to her for having sent a frigate round the world solely to augment our acquaintance with the natural productions, physical structure, climatic conditions, and inhabitants of various remote regions.

Greenland—Former Conditions of Northern Europe.—Our knowledge respecting the snow and ice clad region of Greenland has been from time to time largely increased by the communications of our foreign member Dr. Rink. It is in part through his memoirs, as published in our volumes, that geologists have been enabled to reason upon what they believe to have been the former glacial condition of Scotland, and other tracts in Northern Europe, during a period antecedent to the creation of man. Independently, however, of any acquaintance with the condition of Greenland, as explanatory of ancient phenomena, my illustrious friend Agassiz, in the year 1840, boldly applied to the larger part of the northern hemisphere, and specially to Scotland, the doctrine which he had derived from a study of the effects produced by glaciers in the Alps. Wherever he found that the hardest rocks of North Britain had been rounded off, polished, and striated by lines and furrows in the same manner as that by which the rocks beneath or on the side of existing glaciers are affected, there he contended solid ice had once advanced from the mountains to the sea-shore. This view, though supported vigorously by my dear friend and eminent master, the late Dr. Buckland, met at first with much opposition, though of late years it has been well upheld by much good evidence, patiently worked out by Professor Ramsay and various authors; and in the last years particularly by Mr. Jamieson of Ellon in Aberdeenshire, and by Mr. Archibald Geikie, of the Geological Survey. Now that the direct analogy of Greenland has been prominently brought forward, the bold theory of the great Swiss naturalist, who founded it on his knowledge of the Alps, has, to his great honour, been well sustained. Though once a sceptic as to a former spread of snow and ice over a large portion of Scotland, I have for some time been a firm believer in the application to that country of this portion of the theory of Agassiz.

The manner in which the snow of the mountains descends and in the first instance forms "névé," the solid glaciers which advance to the shores of Greenland, and the mode in which huge masses of these glaciers are broken off and launched into the sea, have been described by other authors, but by none more clearly than by Dr. Rink, whose long residence in Greenland has naturally given him favourable opportunities for observation. In his last memoir Dr. Rink has shown us, that though little water is apparent on the surface of the ice, yet that every glacier is a frozen mountain-river, which is greatly aided in its descent to the sea by a volume of water (about a sixth part of the whole icy mass), which flows either in interstices of the ice, or between the warmer subsoil and the thick cover of ice which prevents congelation. The proofs of the issue of large quantities of water from beneath the lofty ice-cliffs is seen by the issue of springs of fresh water, which rise like whirlpools at the external edge of the ice; and that some terrestrial living things are brought out in these agitated masses is proved by myriads of sea-birds being seen to hover over them, to obtain food in the brackish and muddy water.

The occurrence of an unfrozen lake at a certain distance inland in one of the great glaciers, and the occasional sinking of its water, is accompanied by a corresponding rise of the springs in the sea, and the rise of its water by their diminution. At first sight I thought it possible that this existing phenomenon might in some degree serve, though by no means entirely, to explain the manner in which Mr. Jamieson, adopting the theory of Agassiz, has recently accounted for the so-called Parallel Roads of Glen Roy; * the lake on whose edges these terraces are supposed to have been formed having been held up by a glacier, the successive shrinkings of which at intervals let the water off from higher to lower levels. But looking to the Greenland case as the result of occasional and frequent openings of channels for the water, I see nothing in it which will account for the gravel terraces of Glen Roy at separate and distinct heights. In our Highland example, I now believe with Agassiz and Jamieson, that the lacustrine waters were held up by a glacier; yet, knowing that each gravel terrace on their shores could only have been formed in tranquil periods, the distinct separation of the one from the other is to me a clear proof that sudden movements of the subsoil and rapid change of climate occasioned paroxysmal dislodgments of these icy barriers. By this

* See Quarterly Journal Geological Society, vol. xix. (1863.)

process the successive subsidences due to the sudden collapse and removal of large portions of glaciers will as well account for the distinct separation of terraces which were accumulated during periods of quiescence, as the successive upheavals of the sea-shore (as I shall presently show) explain to us clearly how the heaps and terraces of gravel with sea-shells, which occur at different altitudes around the British Isles, were produced.

In this way the geologist, reasoning upon true existing causes to which he can still appeal, calls up before the mind's eye the ancient physical geography of the surface at a period in all probability antecedent to the creation of man. Pursuing the same mode of reasoning into periods much more remote, he performs the part of the comparative geographer, and can, like Godwin Austen,* map out as pristine oceans the larger portions of our present continent and islands. For, as many of these masses of land are replete with the remains of marine animals, the inference is inevitable, that these materials must have been accumulated under the sea, and subsequently raised into the atmosphere to form dry land. On the other hand, as these desiccated sea-bottoms and sea-shores, which are now habitable lands, are filled with the detritus and fragments derived from ancient rocks; so in those tracts where there are no similar rocks at hand to account for such *spolia*, we infer that, just as the bottom of the sea has been raised up in one tract into dry land, so many of the ancient continents and islands from which such rocky fragments were derived, have disappeared and been submerged, though others remain above the waters. In this point of view the science of geology is true ancient physical geography.

But to return to the consideration of that glacial condition of the surface which geologists are pretty generally agreed upon as having been that which immediately preceded the creation of the human race. Believing, as I now do, that snow and ice formerly covered, during the whole year, my native Highlands, as well as the mountainous parts of England, Wales,† and Ireland, and, further, that glaciers descended from the higher grounds into the adjacent valleys and to the sea-board, transporting into the sea-bottom great blocks as well as enormous accumulations of clay and sand with striated fragments of rocks, constituting the "till" of Scottish

* See Quarterly Journal Geol. Soc., vol. xii., p. 1856, and other memoirs by Mr. Austen.

† On this subject Professor Ramsay's excellent and original Papers should be consulted; particularly the general reader should peruse his Essay on the 'Old Glaciers of Switzerland and North Wales,' in the 1st volume of 'Peaks, Passes, and Glaciers,' and also published as a separate volume.

geologists,* I must impress upon you that, in adopting this view, you must not embrace the largest portion of the operations of transport which took place in the glacial period. For, when the ancient glaciers advanced to the seas of that glacial epoch, they must (as is now taking place on the shores of Greenland) have launched from their cliffs huge icebergs, which were floated away by the prevailing currents, often to vast distances before they were melted. So in the present day numerous icebergs are wafted for hundreds of miles to warmer and southern seas, in which they disappear, and strew the surface of the sea-bottom with the blocks and pebbles with which they were loaded, to be mixed up with marine shells, sand, and mud.

Similar accumulations of a former period are called by geologists "marine glacial drift;" and, as they are found to be spread over wide terrestrial areas, both in low tracts and on hills of some altitude, it is clear that such low lands and hills were submerged during the mixture of these water-worn materials with sea-shells, and have since been elevated from beneath the sea to their present position. The coasts, and some of the bays, of Scotland, and of parts of the north of England, North Wales, and Ireland, afford, indeed, proofs of the glacial drift with shells lying at various heights above the sea up to altitudes of about 1300 feet.

In no part of Europe, however, are the evidences of glacial drift and huge erratic blocks so remarkable as in that enormous region over which such wide-spread detritus has been shed from the ancient glaciers of northern Scandinavia and Lapland, and been carried, eccentrically, to the shores of the North Sea—to the heart of Russia in Europe—over the plains of Poland—up to the foot of the Carpathian Mountains, and finally over all Northern Germany, including the kingdom of Prussia. On this point I may refer you to the detailed description of this grand phenomenon, given by my colleagues de Verneuil, von Keyserling, and myself, in our large volumes on Russia and the Ural Mountains—a work little referred to, I apprehend, by my countrymen. In the map attached to that work we laid down for the first time the south-eastern, southern, and south-western lines to which this, the grandest of all the European glacial drifts, extended, when all the kingdoms now covered by it must have been beneath the sea. In short, we showed clearly that

* See the very clear and able illustration of this subject, with a map shewing the various directions followed by the old glaciers, in the book entitled, 'On the Phenomena of the Glacial Drift of Scotland,' by Archibald Geikie. Glasgow, 1863.

the south of Sweden, as well as Finland, Russia, and all Northern Germany, must have been submarine when the erratic blocks derived from the glaciers of Lapland and the north of Scandinavia were floated far away, some of them to distances of 700 or 800 miles from their original sites.*

When we reflect upon the differences which the map of Europe at the period of this translation of glacial detritus must have exhibited, if constructed when whole kingdoms were under the sea, and that this grand operation was coincident with the existence of species of shells which are still living, and this, too, in the period antecedent to the creation of man, the physical geographer naturally appeals to the geologist, and craves from him some information as to the manner in which these enormous transformations of vast sea-bottoms into plateaux, continents, and islands, may have been brought about.

Now, although all geologists agree that such mutations did take place, we are not of one mind as to the manner in which these mighty changes were effected. One school maintains, that, if we extend existing causes backwards into countless ages, their effects have been adequate to account for all these changes of sea and land. On the other hand, there are many practical geologists, including myself, who see in most lands, and particularly in all mountain-chains, numerous great breaks and frequent inversions of rock formations, which are the clearest proofs of violent fracture, and which no amount of small and imperceptible risings could ever have effected. We therefore infer that some of the changes between sea and land, which accompanied and followed the glacial period, were, like many that preceded them, suddenly produced. Fully admitting that there were long periods of quiescence, during which the crust of the earth was subject, as at present, to small imperceptible movements only of elevation and depression, we believe that there were also at intervals powerful and sudden upheavals and downthrows, accompanied, doubtless, by great translations of water.

As regards the more recent elevations and depressions, we sustain this belief by showing that marine remains of the most recent tertiary date (the post-pliocene of Lyell) are found at different altitudes, separated from each other by great intermedial spaces, wherein such remains are not traceable or visible. These marine

* See 'Russia in Europe,' &c., chapters 20 and 21, with diagrams, and particularly the map, which shows the south limit of the erratics.

remains *generally occupy separate terraces or plateaux and elevated plains*, and are rarely if ever seen lying continuously in slopes upon a hill or mountain side, as if indicating a gradual uprising from the sea-shore to their present positions (often upwards of 1000 feet above the sea). Had slowly gradual causes been in action only, we should surely have seen proofs of the phenomenon by finding the marine remains sometimes arranged in *sloping* accumulations, and not in terraces or heaps at separate altitudes, which necessarily imply sudden jerks or lifts. We further argue, that, if the very slight and almost imperceptible movement (and, in some instances, perfect stability, of the present surface of certain tracts during the last 2000 years) were alone to be appealed to, no conceivable amount of time would explain many of the broken features which Nature presents to us.* Thus we know, from finding remains and bones of the same species of extinct mammalia in the gravel of Britain and the Continent, that at a, geologically speaking, recent period our islands were united with France. We also know, from the skeletons of the great Irish elk, which are found in the bottom of the bogs of Ireland, and also in the Isle of Man and in Cheshire, that when that creature lived these three islands must have been united. Yet it cannot surely be maintained, that by the ordinary action of the sea, and a gradual depression of the lands now sunk beneath the Irish Channel, England and Ireland were separated since the gigantic elk (Cervus megaceros) inhabited our lands. Nor by such gradual agency only can we ever account for the formation of the great channel which now separates England from France.

My firm belief, indeed, is, that these separations were effected in the first instance by powerful breaks of continuity, caused by much grander earthquakes than any of which history affords a record, due to expansive internal forces, which gave rise to great upheavals and subsidences in the crust of the earth. In more remote periods, or those of older geological date, these forces have, we well know, produced still more intense disruptions, and have even abruptly thrown enormous masses of hard pebbly sediment under the rocks out of whose detritus they have been derived.

But even looking at the mutations which were produced in the comparatively modern glacial period, and in that which immediately followed it, I view each of these sea-shell terraces to which I have

* There is every reason to believe that the eastern shores of Britain, where Cæsar landed, have not changed their relation to the sea-level since that event.

alluded, and which present themselves at separate levels around the coasts of continents and islands, as clear proofs that they were not placed in their present positions by continuous gentle gradual movements, but have been, I repeat, heaved up suddenly; such movements having been accompanied by powerful translations of water, which completed by denudation the work which great earthquakes and dislocations began.

I must not, however, wander further into such geological considerations, though I may take leave to say, in reference to the former changes of the surface of the globe, that whether we adopt, as I do, the theory of former, occasional, great paroxysmal disturbances, followed by long periods of quiescence, or that of an uniformity of causation during all ages, I have already said enough to show that the sciences of Geology and Geography are inseparably connected. This subject has, indeed, been well treated lately by Professor Ramsay in his published lectures on the Physical Geology and Geography of Great Britain.* Such of my hearers as wish to follow out this subject, and who have not time to study the great works of Lyell on the Principles of Geology, will do well to read a lecture of Professor Ansted, entitled, 'The Correlation of the Natural History of Sciences,'† in which the author happily demonstrates that Geology includes Physical Geography, General Physics, Chemistry, Astronomy, Zoology, and Botany, and is therefore a history of Nature during all time.

Asia.

Central Asia.—The southern portion of Central Asia—a region which is peculiarly interesting to British geographers—has recently received a valuable illustration through the explorations of M. Nicholas Khanikoff and his scientific Russian associates, to which some allusion was made in the Address of last year. As an experienced traveller in Persia and Bokhara in previous years, M. Khanikoff devotes the first sixty-eight pages of the work he has published to a fair and well-condensed retrospect of the labours of his predecessors in the provinces of Khorassan, Yezd, Kirman, Seistan, and a part of Affghanistan.

Among the earliest geographers to whom M. Khanikoff renders just tribute, I am glad to see that the names of our countrymen,

* Stanford, 1863.
† London and Cambridge. MacMillan. 1863.

Rennel and Forster, stand out conspicuously; the one as the joint founder with the celebrated D'Anville of the science of Comparative Geography, the other as the first traveller, in modern times, who crossed the Continent of Asia from India to Europe, and who did so successfully in the disguise of an Oriental pilgrim.

In the early part of the present century (1807-9) the French *savans* Dupré, Jaubert, Trézel, and Truilhiet, who were attached to General Gardanne's Mission to Persia, zealously exerted themselves in extending our acquaintance with that country: and shortly afterwards further accessions to our knowledge were made by the travels of our countrymen, Pottinger and Christie, who were sent to explore Southern and Central Persia by my lamented and gifted friend the late Sir John Malcolm, when that distinguished man proceeded with a brilliant staff of officers from India to counteract French influence at the Court of the Shah. Of their travels and observations, as well as of the great general work of Malcolm himself, the 'History of Persia,' M. Khanikoff gives a succinct account. Enlivening his recital by allusions to the 'Lalla Rookh' of Moore and the 'Hadji Baba' of Morier, he assures us, and competent English Orientalists agree with him, that the last is the best work ever written, as giving a faithful and vigorous picture of the habits of the higher classes in Persia. Returning to pure geography and travels, he criticises somewhat severely the memoir and map of Macdonald Kinneir, as superficial and devoid of novelty; but praises highly the solid information contained in the rich materials given to us by Sir William Ouseley. He also mentions with much commendation the numerous geographical data and positive observations of Baillie Fraser and the acumen of Arrowsmith in preparing his map. He then shows how the lamented and gifted Arthur Conolly, from his more perfect acquaintance with the language of the natives, surpassed in many respects all his predecessors—especially in his faithful sketch of the social condition of the people. In one of his earlier expeditions, M. Khanikoff knew Conolly well; and quitted Bokhara only forty days before that unfortunate officer, and his companion, Colonel Stoddart, were assassinated by order of the crazy Emir.

M. Khanikoff next speaks of another of our English enterprising heroes, my dear friend Alexander Burnes, who formerly so captivated us by his lively and intelligent communications, and from whose flying notes Arrowsmith was enabled to construct the map of those

countries which for a long time was our only authority. This retrospect of the labours of British explorers and geographers will be read with pleasure.

Turning to other labourers, M. Khanikoff considers the maps of Zimmermann to be complicated and confused. The Russian mathematician Lemm is then brought out, and the vast number of his astronomical observations, his lines of march through Persia, as well as his determination of the heights of the mountains, are noticed. He informs us, that, in a journey of thirteen months, Lemm determined 129 geographical points, over 10 degrees of latitude and 15 degrees of longitude; eighty-three stations of observation being in Persia.

The admirable grouping of the labours of these travellers by the lamented Carl Ritter, particularly in regard to the southern parts of the interior of Asia as given in his eighth volume, is deservedly praised as the best type of descriptive geography; and I specially recommend those pages of M. Khanikoff (44 to 55) to the perusal of such of my associates as desire to seize the salient points of the writings of that great Prussian geographer and excellent man, Ritter.

As to the 'Asie Centrale,' that striking work of my illustrious friend Alexander von Humboldt, and which I duly analysed in former volumes of our Journal, M. Khanikoff alludes but little to it, since it scarcely touches upon Persia and Khorassan. On the other hand, he expatiates on the more recent military operations in Central Asia, such as the Shah of Persia's advance upon Herat, the Russian efforts to reach Khiva, and the English expedition to Cabul, showing how much geographical science has benefitted by such movements, though in a military point of view they were real disasters. We thus have references to the labours of Major D'Arcy Todd, who travelled from Teheran by Herat, Candahar and Cabul to Simla, and was subsequently for some years stationed at Herat as our Envoy; and we have notices also of Major Todd's assistants, James Abbott and Richmond Shakespeare, both of whom passed from Herat by Khiva and Orenburg to the Russian capital; the journey of the latter officer having been recorded at the time in our Journal.

Not omitting to notice the value of the astronomical and hypsometrical observations of Major Gough, published in 1841, M. Khanikoff further attaches much importance to data accumulated by Edward Conolly (brother of the traveller) in Western Afghan-

istan, and particularly in regard to the form of the great lake Hámoun in Seistan.

After an analysis and criticism of the labours of Ferrier and Keith Abbott, and due reference to the 25th volume of our Society's Journal, in which the tours of the last of these travellers are published, he speaks of the extraordinary journey said to have been performed by a French officer by the head-waters of the Heri-rud to Herat, which, if it be an authentic narrative, is deserving of the highest admiration.

Having thus given a succinct analysis, in chronological order, of recent travels in Central Asia, showing what French and English travellers had respectively accomplished, and how his countryman Lemm was the first to furnish solid materials for the construction of a map of Eastern Persia, M. Khanikoff points out how much remained to be done before a correct idea could be formed of the physical features of this region. In order, therefore, to obtain a somewhat better acquaintance with the great terraces at the foot of the mountains, with the hydrography of the country, the structure and direction of the mountain-chains, the fauna, flora, and ethnography of the region, as well as to make observations on terrestrial magnetism and heat, he proposed that a scientific expedition should be formed in Russia. His proposal was willingly embraced by the Imperial Geographical Society of St. Petersburg; and, aided by men distinguished in astronomy, botany, geology, and topography, M. Khanikoff was himself named chief of the Commission. For this station his previous journeys and experience in the East had thoroughly qualified him; for, besides having resided during many years in the North of Persia, he had been in one expedition the companion of that great botanist the late M. Lehmann, and at another period he had been, as before said, the friend and colleague of our unfortunate countrymen Conolly and Stoddart, at Bokhara.

In the volume already published, and which can only be considered as a prelude to the rich materials which are to follow, M. Khanikoff gives us a sketch of the whole line of march of the Russian scientific Commission eastward into northern Khorassan, then across part of Affghanistan to Herat, and thence into Seistan on the borders of Beloochistan, and further by Nilo, across the great saline desert of Lout, to Kerman. Having sent observers to Tebes and other places, he returned by Ardekán to Teheran. In perusing the sketch of the difficulties which he had to overcome in transporting his small party across certain tracts, particularly the

great saline and waterless desert called Lout, the reader cannot but be forcibly impressed with the enormous difficulty, if not, indeed, the impossibility, of moving any regular modern army, with its baggage, artillery, and commissariat, across such regions; and this may afford some comfort to those persons who have been needlessly alarmed at the bugbear of a Russian overland invasion of British India with a vast host!

As the small map which accompanies his memoir is very clear and satisfactory, and is essentially a great improvement upon the previous maps of these tracts, we have to thank M. Khanikoff for this instalment of a work, the first sketches of which were laid before British geographers by himself, at the Oxford Meeting of the British Association (1860).

The western portions of Persia, and much of the region to the south of the Caucasus, had been well examined by our early Medallist Sir H. Rawlinson and others, including General Monteith; but the geography of Southern and Eastern Persia, and the adjacent countries, has been infinitely better defined by the researches of M. Khanikoff and his party than by his precursors.

In a short time it is to be hoped that very valuable additions to our acquaintance with the geography of Western Persia will also be made by the publication of the labours of Lieutenant Glascott, R.N., who was employed as surveyor from 1849 to 1853 with the Anglo-Russian Commission, appointed to fix the delimitation of the Turco-Persian frontier from the mouth of the Euphrates to Mount Ararat; and who has been occupied ever since, in conjunction with his Russian colleague, in laying down the result of the survey on a map of enormous dimensions, and containing the correction of the geographical positions of many places to the east and west of that hitherto ill-determined frontier. The frontier of Persia in the opposite or south-eastern direction seems to have been of an equally uncertain nature, and at various periods to have encroached considerably upon Beloochistan. Of that region, and particularly as regards the northern coast of the Indian Ocean, we have acquired information, which is quite fresh, from the journey of Major Goldsmid, of which I have elsewhere spoken. In his examination of the particular track along which the electric telegraph which is to connect British India with London, will pass, that officer has ascertained that several of the rivers and other geographical points have been very inaccurately placed on all former maps. In fact, although Pottinger, Masson and others have travelled extensively

in Beloochistan Proper, and although we have marched an army through the province and still retain a Resident at its capital, we were very ignorant of the sterile region which forms its southern shores, and which is governed by petty chiefs under the suzerainty of the Khan of Kelat.

Proposed New Route to British India.—In the preceding notice of the character of Lord Gifford, I have specially alluded in a note to the striking photographs of the Himalayan and Cashmirian regions by his Lordship's brother, Lord William Hay. After a long residence in the mountainous parts of India, and a frequent intercourse with travellers from the north-west, or the countries of Bokhara, Kashgar, Ladak, &c., Lord William contemplates a return to his post by an overland route which no one individual, and certainly no European, has yet followed. If he can meet with the protection of the Russian Government, he would take the line across Siberia, followed by the lamented Atkinson —*i. e.* by Nijni Novgorod, Ekaterinburg, Omsk, Semipalatinsk, Kopal to Issyk-kul. He calculates that he might reach that distant place in fifty-two days' travelling from Nijni Novgorod, or say in two months. From Issyk-kul to Kashgar is only 250 miles, and allowing for every difficulty he assigns to this march fifteen days; from Kashgar to Le by Yarkand, he gives thirty-six days, and from Le to Kungur in Cashmere fifteen days, or in the whole about four months.

Now, Lord William Hay is not a wild schemer, but a practised traveller—one of the four brothers of that family * who have traversed the Himalaya to the plains of Thibet. After fourteen years' residence in those mountains and in Cashmere, and after obtaining for us all the real intelligence we possess respecting the fate of poor Adolf Schlagintweit at Kashgar, he has well weighed the possible obstacles to such an enterprise. He knows that the present political state of affairs in the region of Kashgar and Yarkand is very different from what it was when Adolf Schlagintweit was assassinated; and he also infers that in the journey from Issyk-kul or those wild hordes of Kirghiz over whom the Russian power extends he would have great advantages if furnished with Imperial passports and support. I need not say that, as I warmly approve the bold project, I will do all in my power to induce the Imperial Government to enable this enlightened British nobleman to execute a journey which has never been performed by any European, and

* See Gifford in the Obituary.

which, if he passed over the Karakorum into Cashmere, would unite in one long chain the old route of Marco Polo with the journeys of modern travellers who have hitherto vainly endeavoured to pass from the east to west or from west to east in those latitudes.

Indian Navy.—On the 30th of April of the present year the Indian Navy ceased to exist; the Commodore's broad pendant having been hauled down at Bombay on that day. I cannot, therefore, allow this occasion to pass without making some allusion to the debt which geography owes to the officers of that distinguished service. The war services of the Indian Navy in Burmah, China, and Persia, as well as the beneficial and enduring results of its repression of piracy and the slave-trade are well known. These services have been varied, honourable, and useful; but, in the eyes of geographers, the wide-spread and lasting utility of the excellent surveys made by officers of the Indian Navy on the coasts of India and Arabia, in the Persian Gulf, and in the Red Sea, on the coasts of China and Cochin China, hold an equally prominent place; nor as a geologist can I omit to call to your recollection the admirable memoirs of Dr. Carter on the structure and fossils of the coasts of the Persian Gulf. In the abolition of the Indian Navy, the Bombay Geographical Society will, I fear, sustain a loss which it will not be easy to replace; while the numerous able papers scattered through our own volumes, by Kempthorne, Selby, and other officers of that service, remind us that we are sharers in the loss. I trust, however, although their honourable career in the Indian Navy has come to a close, that many of the gallant officers who composed it will still be enabled to render their great ability as surveyors and explorers available for the advancement of geographical science.

Telegraphic Communication by Land and by Sea.—Two years have elapsed since Sir Henry Rawlinson brought under the consideration of this Society the importance of constructing an overland telegraphic communication with India, and pointed out how far the work had already proceeded, and the track which ought to be followed in completing the remainder of the line. He justly observed, that the Royal Geographical Society would do itself honour by encouraging this great work. At that time, however, no one had accurately examined the nature of the country of Mekran at the head of the Indian Sea, which lies between the British Indian frontier, near Kurrachee, and the mouth of the Persian Gulf. That task has been now accomplished by Major Goldsmid, who has shown

that there are no real physical or political obstacles throughout the tract in question; the greater part of which is tributary to the Khan of Beloochistan, the western portion only being subject to the influence of Persia. I have elsewhere alluded to the sketch of Major Goldsmid as making us acquainted with a tract, which, though it was, in days of yore, the scene of great events, had so passed into oblivion that, save for the unpublished notice of it by one Englishman, a Mr. Macleod, who traversed a portion of it only, the nature of the country was quite unknown to us; the position even of the rivers which flow into the sea having been most incorrectly laid down on all our maps. The search for the best line for the construction of the most comprehensive civilizer of modern days, the Electric Telegraph, has thus called once more into prominent notice a region, the shores of which, in all probability, were coasted by the ships of Solomon when trading to Ophir, and the interior of which was undoubtedly traversed by the armies of Alexander the Great.

The direction of the whole of this telegraphic communication, which is to be in part submarine, has fortunately been placed under the management of Colonel Patrick Stewart, an officer of the Indian Army, signally distinguished by the great ability and intrepidity with which he rapidly constructed those lines of telegraph in India, during the late rebellion of the native army, which were of such essential service to Lord Clyde.

Colonel Patrick Stewart, who has personally examined a great portion of the line, including the coast of Mekran, informs me that the first link of the chain between India and Europe is that to which I have just alluded as having been explored by Major Goldsmid. This section, from Kurrachee to Gwadel, measures about 400 miles, and along a considerable portion of it, 250 miles from Kurrachee, telegraphic stations have already been erected. From Gwadel the line becomes submarine for about 400 miles as far as the Arabian headland called Ras-al-Jebel, at the entrance of the Persian Gulf, from which station another submarine stretch of 430 miles will bring the telegraph to the port of Bushire, whence the land-line will branch off, passing through Shiraz and Ispahan to Teheran and eventually to Constantinople. A branch-line is also to be extended from Teheran to Baghdad, which will provide a secondary or alternative means of communicating between Baghdad and Bushire. The principal and more direct line, however, between these points, is that which it is proposed to carry out

by means of a submarine stretch of 170 miles, from Bushire to Fao, at the mouth of the Shat-el-Arab river, and thence, by land, through Bassorah and along the western bank of the Euphrates, to ancient Babylon and Baghdad. The line from Baghdad to Constantinople, which was constructed some years back by British officers and workmen at the expense of the Turkish Government, continues in good working order, and telegraphic messages are thus constantly passing between London and Baghdad along a track which is more than two-thirds of the entire distance to India.

I further learn from Colonel Stewart that the ships from which the submarine cable will be laid are to leave England in July, and that the operation of submerging it will commence about the middle of November, and be terminated in December. It is also confidently expected that the land-line from Fao to Baghdad will be speedily finished, and that a direct and through communication from London to Calcutta will thus be for the first time established before our next Anniversary Meeting. Further, it is calculated that the alternative line through Persia will also be finished in the spring of next year, and that a double means will be thus afforded of communicating with our great Indian Empire.

While enterprise and capital are thus employed in connecting England with India, one of our associates, Mr. C. M. Grant, who recently contributed an instructive sketch of his travels from China to Siberia, across the Desert of Gobi, is now actively employed in the endeavour to induce the Government of Russia to establish a telegraphic communication between Kiachta and Pekin, and even, if possible, so to extend the Siberian line eastwards as to reach the shores of the Sea of Ochotsk, whence to the continent of Russian North America the transit requires a short submarine stretch only. There can be little doubt that, independent of other considerations, this would be the line of all others by which Europe and America can best interchange messages. Should such and other enterprises like these succeed, men, even of my own age, may live to find the electric spark carrying knowledge in a few minutes round the globe, and enabling us even to converse with our countrymen at the antipodes. Already an attempt is being made to put us in direct communication with Australia; Mr. F. Gisborne, brother of the late Sir Lionel Gisborne, being engaged in an attempt to organize a telegraphic service from Calcutta, through Burmah and the Malay peninsula to Singapore, and thence to Batavia, Soerabaya, Timor, and North Australia, *viâ* Melville Island.

Whilst the physical geographer is sure to acquire fresh knowledge by the examination of distant lands over which telegraphic wires have been, or are about to be laid down, and that submarine cables are in action in seas of such limited dimensions as the Mediterranean, the Red Sea, and the Persian Gulf, let us not despair of obtaining such a better acquaintance with the bottom of the great ocean which separates Europe from America, as will greatly obviate the difficulties which have hitherto impeded the successful accomplishment of the grandest of all the submarine telegraphs which have been proposed. To this point I next direct your attention.

North Atlantic Sea-Bed.—In contributing to our better acquaintance with the natural history of the sea, as ascertained during the voyage of H.M.S. *Bulldog*, under the command of Sir Leopold McClintock, Dr. Wallich* produced, by soundings at great depths, excellent materials to enable men of science to appreciate more correctly than before, the feasibility of laying down a submarine telegraph between Ireland and North America. Extending the Bathymetrical limits of animal life in the ocean to the great depth of 7500 feet, or 1½ mile, beneath its surface, and working out accurate data as to the varied condition of the sea-bottom at different depths, he was well qualified to propose to our Council a scheme for such a systematic survey of the sea and sea-bed between Ireland and Newfoundland, as might lead to the laying on a sound basis a submarine telegraphic cable between the two countries.

Attributing the fears and doubts as to a successful issue of the schemes put forth chiefly to the inadequate methods hitherto employed in examining the sea-bed by the rapid transit of our surveying ships, and by soundings taken on one line only at great distances apart, Dr. Wallich proposed that a much closer search should be made before telegraphic cables were lowered into unknown depths, and laid across submarine hills, gorges, and valleys, the irregularity of whose forms, as existing between the points hitherto sounded, might prove to be enormous. He argued that a full and proper submarine search was as essential a preliminary to a rational scheme of laying down a telegraphic cable, as a survey of the outlines of land was requisite for the engineer before he could accurately define the best and safest line to be followed by a railroad.

* See Dr. Wallich's work, published with the sanction of the Lords of the Admiralty, entitled 'The North Atlantic Sea-Bed.' London, 1862. Van Voorst.

Being of opinion that such an effort was well worthy of their encouragement, the Council of our Society supported the project of Dr. Wallich, not only in the belief that its execution must throw much light on this interesting branch of physical geography, but would also develope various phenomena of great interest in natural history, geology, meteorology, and physics. On my own part, being very desirous of seeing so noble an exercise of the searching powers of this great maritime nation set on foot under the management of so energetic a naturalist as Dr. Wallich, I earnestly recommended its adoption to the First Lord of the Admiralty. But, as the project matured, it speedily appeared that Dr. Wallich required two steamers for the effectual survey in question, which demand was considered to be too heavy at a moment when few vessels could be spared from our naval reserves; and hence the consideration of the subject has, for the present, been dropped. I hope, however, that in more quiet times a complete submarine survey of the Atlantic will be carried out, by the joint operations of nations on *both* sides of that ocean; and when that day arrives, I trust that the project of Dr. Wallich, with all his ingenious appliances, will obtain the countenance of the public, just as in an earlier stage it has met with the approbation of the Council of the Royal Geographical Society.

Japan.—The privilege accorded by treaty to the British Minister in Japan to travel through the empire has been taken advantage of by Sir Rutherford Alcock, who during a journey of thirty-two days traversed the island of Kiusiu and a great part of Niphon. In the interesting paper which was read to the Society, much light was thrown upon parts of the country heretofore but little known. Although Dutch Missions had occasionally gone overland from Nagasaki in Kiusiu to Yeddo in Niphon, their opportunities for observation were necessarily limited, owing to the rigour of the surveillance to which they were subjected by the Japanese Government. In the case of our Minister these rules were relaxed; and, although a good deal of jealousy was frequently manifested by the officials, we have acquired a great deal of most valuable and useful knowledge. The part of the road leading from Osaca to Yeddo, and which avoids Miako, traversed by Sir Rutherford, has, so far as we are aware, not been travelled over by any European: the Dutch Missions always following the route through Miako since the expulsion of the Portuguese and Spaniards more than two centuries ago. We have also had a short paper from Mr. Oliphant,

giving some account of the island of Tsusima, a spot which was visited by Europeans for the first time in the spring of 1861; and which derives its importance no less from its geographical position than from the magnificent and deep harbour which it has been discovered to possess.

In spite of these additions to our information of the geography of Japan, there is still much to be done. The whole northern and eastern portion of the central island of Niphon is still unexplored, the large island of Sikok has not yet been visited; while of the northern island of Yesso, which contains a larger superficies than Ireland, we know nothing beyond the observations made by Mr. Pemberton Hodgson during a very limited tour from Hakodadi. The interior, which is supposed to be uninhabited, is still a sealed book. It is to be hoped that no political difficulties will arise, to put a stop to the interesting work of exploration in a country which affords such a wide field for the labours, not only of geographers, but of men of science generally.

Mexico.—A good addition to the valuable descriptions of Humboldt respecting the meteorology of this country as dependent on its physical structure and outline has been recently published by M. Henri de Saussure of Geneva. Visiting Mexico before the French invasion the author has, notwithstanding the continual interruptions to the prosecution of travel caused by the civil wars which desolated that interesting region, succeeded in sketching in a very clear manner the great features, and also in explaining the causes, of its very remarkable hydrology.

South America. Peru.—Don Antonio Raimondy, who has been occupied for two years in exploring that part of the valley of the Amazons, and of its tributaries the Huallaga and Ucayali, which is comprised within the Republic of Peru, has recently published a valuable geographical work, with maps, which has increased our knowledge of that vast but little known region. Another Peruvian geographer, Don Mariano Paz Soldan, whose brother's work, 'Geografia del Peru,' has recently been presented to the library of this Society, is now preparing in Paris a large map of Peru, together with a volume of plans and views.

Mr. R. Clements Markham, while employed by the Indian Government in superintending the collection of seeds and plants of the quinine-yielding Cinchonæ in 1860, explored the courses of two of the principal sources of the great River Purus, one of the most important but least known of the tributaries of the River Amazons,

for a considerable distance, and thus added to the geographical information which he had previously collected during his travels in 1853 respecting this almost unknown part of South America.*

Brazil.—Mr. H. W. Bates, the former companion of Mr. Wallace, who, as a most enterprising naturalist and ethnologist, has recently become known to the public through his excellent new work, 'The Naturalist on the Amazons,' has also increased our geographical knowledge of the main stream of that great river from Ega to its mouth, and of some portions of its tributary the Tapajos.

Australia.—Much as had been accomplished in preceding years by the bold explorers of the interior of Australia, the past year is, if possible, still more remarkable in the amount of satisfactory results, as obtained by the journeys of McDouall Stuart, Landsborough, McKinlay, and Walker. To the progress of these adventurous men I last year adverted in the Address of Lord Ashburton; and now it is my pleasing duty to record their great success. On former occasions, after admiring many of the earlier intrepid researches, we had to mourn over the loss of that great traveller Leichhardt; and, in honouring Burke and Wills as being the first to reach the Gulf of Carpentaria by a direct route from Victoria, we, alas! could only revere the memories of those and other noble fellows, who had sacrificed their lives in the cause of geographical discovery. On the present occasion, however, the enterprises of the travellers have happily not been attended with any loss of life, whilst the objects in view have all been satisfactorily accomplished.

To begin with the last exploits of our former medallist, McDouall Stuart—and for which the late Governor of the colony of South Australia, Sir Richard MacDonnell, claims the blue riband of Australian exploration. No one can peruse the diary of Stuart's last journey from Adelaide on the southern to Van Diemen Gulf on the northern shore, without admiring the steady perseverance with which, in his last as in his first expedition, he overcame all the natural obstacles opposed to his progress. Thus, we mark with approbation his repeated and toilsome efforts to penetrate through a thick, waterless, central forest to the north-west. For, if those efforts had succeeded, he would probably have reached the sea at the mouth of the northern Victoria,†

* The volume which Mr. Markham has published descriptive of his last travels has been received with favour by the public, as embracing much interesting history of the native Peruvians with which we were unacquainted; whilst his successful translation of various species of the Cinchona plants to India, and the plantation of them in localities best suited to their growth, has met with the unqualified approbation of the Government of India.

† The Victoria was discovered and named by Capt. Wickham, R.N.

or that position to which I have twice adverted in previous Anniversary Addresses as the situation of all others on the northern coast best suited in my opinion for the establishment of a new colony. There are, indeed, physico-geographical causes which account for the salubrity of that intertropical station, and to these I shall allude in the sequel. This was the tract to which Stuart evidently intended to proceed. He was, however, driven from his endeavour to reach the sea-shore nearest to him at the head of Queen's Channel, and was compelled to take a due northerly route, which necessarily brought him to the sea on a much more eastern meridian. There the land runs out towards the equator in a broad promontory (the Arnheim Land of maps), which, though indented by fine bays, can scarcely be expected to offer the same advantages of climate and productiveness as the tract at the mouth of the northern Victoria. Still, as the route to it from South Australia has been shown to be practicable, even this district, in nearly 12° s. lat., will, it appears, be soon occupied. By a recent letter from Mr. Finke, of Adelaide, I learn that already a private company had been formed there for the purpose of transporting, in April of this year, sheep, cattle, and horses to the newly-discovered lands in Van Diemen Gulf, whilst a vessel with ample supplies will be sent round to meet the new settlers. This commencement will, I trust, induce Her Majesty's Government to take decisive steps as to the method by which this independent body of settlers and others who may join them are to be governed.

The knowledge we previously possessed, that the colonists of Queensland were rapidly pushing on their settlements towards the head of the Gulf of Carpentaria has been recorded in the despatches of Sir George Bowen, and enlarged upon by the Secretary of the Colony, Mr. Herbert, during his recent visit to the mother country. Before these facts transpired Sir Charles Nicholson, on his last return from Australia, pointed out, in a well-argued document addressed to Her Majesty's Secretary for the Colonies, of which I have seen a copy, that large portions of Northern Australia would assuredly be soon occupied by migratory bands of colonists. He therefore called the attention of Her Majesty's Secretary of State to the confusion and disasters which would follow, if neither law nor system were established by Imperial authority for the government of such broad lands. Sir Charles Nicholson has, I think, successfully shown that any colony on the North coast, or even at the head of the Gulf of Carpentaria, would be much too distant from Queensland or South Australia

to be governed with effect from either Brisbane or Adelaide. And now that the colonists from Adelaide are really about to establish themselves in the distant Van Diemen Bay, the very case suggested by him has occurred and some action will, I trust, be taken by the Imperial authority. The establishment of a separate colony on the North coast of Australia has so long been advocated by myself, whether for commercial purposes or for political and maritime considerations, that I rejoice in having lived to see the dawn of the realisation of this great object. The subject is now about to be brought in a striking manner under the notice of our rulers, who, at no cost to the mother country, have simply to give titles to the possession of rich lands, the sale of which, as Sir Charles Nicholson shows, will speedily far more than remunerate the small outlay which is called for in the outset of such an organisation.

But, whilst the success of any settlement on the north coast is a problem about to be solved, I must again express my regret that the Queen's Channel, at the south-east end of Cambridge Gulf, and at the mouth of the northern Victoria, should not have been the spot whereon the first experiment was to be tried by the settlers. The deeply-embayed position of that site, and the simple fact of its being 4 degrees further removed from the Equator, as well as being bounded by large masses of plateau-land, fairly entitle us to believe that such a situation would be much more likely to secure the health and well-being of the settlers than the Van Diemen Gulf of old navigators, which is about two hundred miles more northward, and on the verge of the heated Indian Ocean. It is true that Van Diemen Gulf is protected from the storms and tornadoes by Melville Island and the Coburg peninsula, on which our former ill-selected and exposed station of Port Essington was placed; but still this first experiment would have been more likely to succeed, especially if the mouth of the Victoria had been the site chosen.

In comparing new maps of Australia with those of older date, I find, on referring to the publications of the Society for the Diffusion of Useful Knowledge, that, in their Atlas issued in 1844, Australia is defined as consisting of the colonies of New South Wales, Van Diemen's Land, Port Phillip, South Australia, West Australia, and *North* Australia. The first, or our oldest settlement, has now had taken from it the region known to former geographers as the Moreton Bay Settlement, which has expanded into the vast and flourishing colony of Queensland (of which hereafter); Van Diemen's Land

has become Tasmania; Port Phillip, then holding a population of 3000 only, has swollen into the rich auriferous land of Victoria, with its grand commercial city of Melbourne; and, whilst West and South Australia have both largely increased in size and importance, the so-called colony of "North Australia" has disappeared from all our maps as an unknown territory! Yet, on the very map to which I have alluded, the great headland to which McDouall Stuart has found his way from the south, has on it, besides the name of Arnheim Land, the following words engraved in large letters, "Colony of North Australia, established 1838." In the legend of the map no population is indeed affixed to it; but now, after the lapse of a quarter of a century, a few spirited Australian colonists are about to revive the forgotten name of the "Colony of North Australia." *

This result will, indeed, be accelerated by the wise suggestion of the Governor of Queensland as now adopted by Her Majesty's Secretary for the Colonies, that a commercial and careening maritime station be established at Port Albany, near Cape York, at the north-eastern extremity of this vast country. In a letter to myself, dated November 19, 1862, Sir G. Bowen, after describing his voyage of exploration of all the north-eastern coast, and showing from the experience of the naval authority, how a safe passage for steamers may always be made within the great Barrier Reef, says of Port Albany, "that it is perhaps destined one day to be the Singapore of Australia." Well may we anticipate such a result when we mark the extraordinarily rapid progress of that flourishing new colony of Queensland. In a recent despatch to the Duke of Newcastle which has been communicated to us, Sir G. Bowen calls the attention of his Grace to the progress and present condition of the colony, which, as now defined, has a surface nearly six times greater than that of the United Kingdom, and the very grazing grounds of which are about twice as large as the British Isles; to say nothing of the tracts peculiarly adapted for the growth of cotton. The map which is attached to the Colonial Almanac of Queensland is worthy of commendation as being a correct delineation of the boundaries and divisions of a country which its accomplished Governor considers to be "undoubtedly the most favoured in soil and climate of all the provinces of the British empire" (Letter to the Duke of Newcastle, 8th Jan., 1863).

From the results of these considerations we naturally turn to the

* Whilst I write, a North Australian Company is in the course of formation in London.

recent exploits of Landsborough, McKinlay, and Walker. Last year we had, alas! to mourn over the deaths of those noble fellows, Burke and Wills, who were the first to go from Victoria to the sea at the head of the Gulf of Carpentaria, and lost their lives on their return. Well may the motto "Præmiando incitat" be applied to the legislature and inhabitants of Victoria, who have done infinite credit to themselves in removing the remains of those geographical martyrs from the sands where they lay, and in erecting monuments to their memory at the metropolis from which they proceeded.

It is indeed cheering to the heart of every geographer and traveller to read the accounts given by the press of Melbourne of the depth of feeling exhibited by the Governor, Sir H. Barkly, the Legislature, as well as by the crowds of the inhabitants who came together to do honour to the deceased explorers, when monuments were raised to their memory.

To determine with precision the tracks followed by the deceased travellers, and to define the amount of good country for settlement in the region so properly named by Sir H. Barkly "Burke's Land," three of the Colonial Governments have been rivalling each other. In the first place, it was as just as it was honourable to the rich colony of Victoria, that she should take the lead in the endeavour to afford succour to the expedition of Burke and Wills. Accordingly, the ship *Victoria*, under the command of Captain Norman, was despatched with supplies to the head of the Gulf of Carpentaria; whilst arrangements were made with the Government of Queensland for the transmission by the same vessel of a party to explore inland under an able and experienced surveyor, Mr. Landsborough. It was also further arranged that Mr. Walker should, with his native mounted police (all bushmen), traverse the country between Brisbane and the head of the Gulf of Carpentaria. The shipwreck which befell the *Firefly*, conveying Landsborough and his party through Torres Straits, and the riskful but successful operation by which the water-logged tender was tugged round the headland and brought up to the mouth of the Albert River, at the head of the Gulf of Carpentaria, have been already recorded. It was then that the researches of Landsborough commenced; and, though the primary object of the Victorian expedition for the relief of Burke and Wills was, alas! frustrated by the deaths of those gallant men, the subsequent results were in the end most satisfactory. For, by these researches we now clearly know that the territory at the head of the Gulf of Carpentaria was most cor-

rectly named the "Plains of Promise,"—a land not too hot, according to Landsborough, for British colonization. Realising the truthfulness of the records of Burke and Wills as to the vast tracts of good land, we may be assured that that region will be soon occupied by our settlers; for Landsborough has told us, and McKinlay has confirmed it, that the country south of the Gulf of Carpentaria is a land rich in herbage, and well fitted for the pasturing of horses, horned cattle, and sheep—the plains being as fattening as any he had ever seen in Australia, and the climate as cool as in many parts where wool is profitably grown (see 'Sydney Herald,' Jan. 21, 1863).

We may also rejoice in the fact recorded by the Exploration Committee of the Royal Survey of Victoria, "that the explorers of the Victorian Expedition were the means of opening out a path from the southern settlements to the northern shores, which they hope will at no distant day be made available for telegraphic communication, by way of Batavia and India, with the mother country." The realisation and complete establishment of such facts are in great measure due to the sagacious and trustworthy explorer, Mr. Landsborough. The son of an accomplished Scottish naturalist, who was an ornament of the Presbyterian Church, Mr. Landsborough was so educated that he possessed all the groundwork for success. After first exploring for 200 miles to the south-west, he took up the return line of Burke and Wills, and first following up the Flinders River south-eastward, he crossed the dividing ground and descended along the banks of the Thomson, and was on his march for Burke's depôt, when, aware of the insufficiency of his provisions, he turned to the east and south, until he struck the River Warrego, which he followed to its junction with the Darling above Fort Burke. I must refer you to the cheering despatch of the Governor of Victoria, Sir H. Barkly, recently read before the Society, for convincing proof, that Mr. Landsborough has practically accelerated in a remarkable degree the formation of a northern settlement. Geographically he has taught us that Sturt's desert extends but little to the east, and that between it and the foot of the Eastern Cordilleras there is a vast, rich, and well-watered pastoral country.

Already stock had been driven from New South Wales to these new grounds, and the public press of Victoria predicts that in a year all the region to the east of 140° E. long. will be mapped out and occupied for grazing purposes. The prospect of easy access

to the sea is also a great attraction to squatters; and it is even said that plans have been already drawn for the construction of a city at the mouth of the Albert on the Gulf of Carpentaria! In short, Mr. Landsborough declared, at a public dinner given to him at Sydney, and at which the Governor, Sir John Young, presided, that if he were going to Carpentaria with stock, he should consider the worst of the journey over when he came to the head of that Gulf.

The journey of Mr. Frederick Walker, with his native bushmen, or mounted police, to the head of the Gulf of Carpentaria, thence up the Flinders, and eventually to the north-east, at Port Denison in the colony of Queensland, has been productive of some satisfactory results. Thus, he made out that it was near the mouth of the Flinders River that Burke and Wills had made their last camps. He also informs us, in laying down the course of the Flinders and Norman rivers, that, although there are fertile plains at some distance from them, the valleys in which they flow are subject to extensive inundations.

It is due to Mr. Walker to say, that, in parts of his course, he made such astronomical observations as enable us to determine the true course of the Flinders River. Nor must his observations upon the heat of the climate be lost sight of, when we desire to estimate the probability of the success of British settlements.* We have yet, however, to learn the duration of the heat in these regions, and to what extent it is tempered by night breezes and by rains.

On these subjects we have a third good authority in that of McKinlay, who, after great exertions, reached the Gulf of Carpentaria from Adelaide in South Australia, and eventually emerged in the northern parts of the colony of Queensland. To the earlier efforts of this bold explorer, as organised under the government of Sir Richard McDonnell, allusion was made in the Anniversary Address of last year, when, in aiding my predecessor, I spoke of Mr. McKinlay's discovery of the relics of an Englishman, which have since been ascertained to be those of Gray. From that scene of misfortune, near Cooper Creek, McKinlay's course was first to the N.N.W.; then making a deflection to the east, on account of great floods, he took a course nearly north until he reached the mouth of the Flinders River in the Gulf of Carpentaria, whence, deviating

* Since this Address was read, I have seen Mr. Bourne, the companion of Landsborough; who informs me that, owing to the coolness of the nights, the climate at the head of the Gulf of Carpentaria in S. latitude 18° is much less oppressive than on the Darling River in S. latitude 31°. So little does mere latitude govern the distribution of heat.

to the E.S.E., he ended his trying journey of nearly a year's duration at Port Denison, in the northern part of Queensland. The narrative of this arduous journey of the "Burke Relief Expedition," bound up with three maps, is, as well as the Journals of Stuart and Landsborough, to be purchased in this country.* In perusing these Journals, I have equally admired the sagacity, self-reliance, and endurance of each of those bold explorers; and it would have been a source of real gratification to me to have recommended to our Council that, at this Anniversary, Gold Medals should have been assigned both to Landsborough and McKinlay. But the Council have felt themselves bound to prefer the antecedent labours of Mr. Frank Gregory in the north-western portion of Australia, which very nearly obtained for that geographer one of our medals last year. In fact, Mr. Frank Gregory had made astronomical observations throughout a large, well-watered, and productive region, extending over 33 degrees of latitude and 19 degrees of longitude; whilst, with every admiration of their prowess and success, Landsborough and McKinlay have only laid down their routes by dead reckoning. Our highest geographical distinction must therefore be assigned to the man who worked out our problems scientifically. At the same time we have taken another mode of testifying our admiration of the services of those intrepid and successful explorers, who have traversed this vast continent, by handing to them other tokens of our entire approbation of their labours.

Along the route followed by McKinlay and his associate Middleton, who has recently come among us, we find the same alternations of poor and arid sands,† with well-watered and rich tracts, and the same proofs of occasional inundations, as in the regions visited by McDouall Stuart. In all these three successful expeditions, as well as in that of Burke and Wills, we have now the proofs before us that, whatever may be the obstacles, Australia can be traversed from south to north by different routes.

Nothing is more striking in the narrative of McKinlay than that, in approaching the Gulf of Carpentaria, after upwards of eight months of travel not only had he still with him camels and horses,

* Besides the detailed Journals, a very interesting volume has appeared whilst these pages are going through the press, entitled 'Tracks of McKinlay and Party across Australia; by John Davis, one of the Expedition. Edited by Mr. W. Westgarth.' (Sampson Low and Son.)

† Mr. Middleton exhibited some of this sand at the Meeting of the 11th May, which is of so red a colour that he compared it to "Cayenne pepper."

but also that the sheep which were left (soon afterwards eaten) had "their kidneys well covered" with fat, in south latitude 19°, notwithstanding their fatiguing journeys and the long grass on which they fed.

The last efforts of McKinlay and his associates, when traversing a tract in great part hard and stony, to reach Port Denison in the north of Queensland, and after their bullocks and camels had all been eaten, is worthy of all commendation.

The appearance at our last Meeting of Landsborough himself, and of Middleton the companion of McKinlay, enabled us to satisfy ourselves that British colonisation can be successfully extended into Tropical Australia. If mere geographers had made this assertion, their dictum would not have made the same impression on Englishmen and Colonial residents as the positive declarations of two practical men like Landsborough and McKinlay, both of whom began as settlers, and having by their sagacity and conduct made independent fortunes, are surely the best possible judges on this debated subject. These gentlemen have assured us that many thousands of sheep are now thriving within the tropics in North Australia, though we have yet to learn whether these animals will permanently flourish if carried to the northernmost shores of the continent.*

In addition to the discoveries recently brought under our notice, let me refer my associates to the 28th Volume of our Journal for evidences showing the feasibility of establishing British colonies on some parts of the north coast. There they will find, not only the full accounts of the memorable researches of our medallist, Augustus Gregory, after he left the mouth of the Victoria, but also the notes of Mr. Wilson, the geologist of the expedition, who, being left in charge of the camp and having resided there for ten

* Mr. Brodribb, late a Member of the Legislative Assembly of Victoria, has written to me expressing his belief that North Australia will become a great wool-producing country. He shews that there are tracts in the southern parts of Australia less propitious for the breeding of sheep than certain parts which approach to the tropics, and where he has reared many fine ones. At previous Meetings of our Society, Mr. M. H. Marsh, M.P., who is also a large proprietor, has assured us that sheep thrive well in parts of Australia to the north of any tract which was previously pastured, and the rapid extension of flourishing flocks in the northern part of Queensland, which is within the tropics, is an undeniable fact—though the farthest successful limits where sheep can flourish has not yet been ascertained. Mr. Brodribb adds, "The settlers in North Australia will, however, have to procure fresh rams every two years from the colder regions, in order to keep up the weight of the fleece; for the animal, while growing older there, will suit itself to the climate. The wool will retain its fineness but not its weight; it will be light and open, but will not become *hair* as was asserted."

months, gives us as perfect a conception as can be obtained of the nature of the climate, productions, and natives of that intertropical tract. In one part of these notes he says, and Mr. H. Gregory confirms him, that in no part of the world had he seen grass grow so luxuriantly. As to climate, he affirms, after giving tables of the mean temperature for ten months of the year, that, although the maximum temperature in the shade was 106°, and the minimum 47°, the health of the travellers and the animals of the expedition was by no means impaired. Surely, with such statements as these before us, theoretical objections to the selection of chosen parts of North Australia as the sites of British communities ought to cease.

In opposition, however, to these data and the inference to be derived from them, it has been argued that, inasmuch as tracts at about 15 degrees north of the equator, in the peninsula of India and other places in the Indian Ocean, are from their great heat unsuited to European settlement, such must also be the case in like southern latitudes in Australia. But this reasoning seems to me to fail when we consider the distribution of heat over the surface of the globe, according to the law which regulates isothermal lines. Thus, whilst the Indian Ocean is necessarily the source of warmth to the Indian peninsula, the enormous breadth of table-lands with their gum-trees in North Australia must to a great extent cool the temperature, and thus bring about a more moderate climate than on a similar parallel to the north of the equator, where water so vastly predominates over land.

Viewed in this way, theory accords with the facts ascertained by our explorers, who, surmounting all difficulties, have laid open practicable routes across the continent, and have shown us that North or Tropical Australia can be colonised successfully. Moreover, as Sir H. Barkly well observes, "the Australian air is so comparatively dry even within the tropics, and the forests of gum-trees so free from jungle, that the climate is far healthier and more endurable by European constitutions than in similar low latitudes in other portions of the globe." *

These recent discoveries have further dispelled those theoretical speculations in which, in common with many geologists and physical geographers, I confess I at one time indulged, as to the vast and continuous extent of internal deserts in Australia. From such desponding views I am now relieved; and I congratulate Governor

* Despatch to the Duke of Newcastle, 21st August, 1862.

Gawler and others, who sagaciously contended, that vast interior districts of rich and fertile lands would be found, to compensate for barren intervening tracts. But, whilst in my Address of 1858, I suggested reasons for scepticism as to the extent of rich interior lands, I said that it would ill become the President of this Society to damp the ardour of those researches by which alone the question could be settled; and I expressed a hearty wish that the Colonists might be gratified, as they have been, by the discovery of such large rich *oases* in the interior. Nothing, in short, in our age, can be more cheering to the geographer than by taking in hand the Map of Australia published by Arrowsmith in 1842, and contrasting it with one on which our excellent cartographer can now insert all the mighty additions which the explorations of the last twenty years have enabled him to make.

In concluding these remarks on the wonderful extension of geographical researches in this continent, let me say that the progress which our enterprising Colonists have made, not only in wealth and material prosperity, but in all that can dignify a people, was strikingly manifested at the last great International Exhibition. In it we saw collocated, not merely the rich natural products of gold and copper, with admirable pictorial views which even enabled us to imagine that we had visited the mines of our antipodes, but we also had before us solid proofs in the publication of excellent Maps and the Catalogues of the valuable Libraries of Sydney and Melbourne, that there is scarcely any branch of knowledge or of industry which is not cultivated in Australia with a zeal rivalling that of the mother country.

Relying on the conversations which it was my privilege to hold with the distinguished men who represented the several Australian colonies on that occasion, as well as with personal friends who have long resided there, I feel assured that there are no people in the wide dominions of Britain more attached to their Sovereign and our Constitution than the Australians. It has always, therefore, been a source of pain to me, when some persons have spoken or written of the coming of the day when these great Colonies are to be separated from us. Seeing no cause for such separation, and believing that our Government and Legislature are much too enlightened to commit the error into which our ancestors fell when Britain lost her North American settlements, we are, I rest satisfied, never likely to estrange our Australian colonists by similar treatment. It has been well said by a late Governor of

South Australia that the loyalty of Australia is an homage to the enlightened rule of England, of which her statesmen may be proud.* On my own part, I am indeed persuaded that, if judiciously and considerately treated, Australia, which affords by far the finest possible field for the emigration of our superabundant population, will long continue to be a source of wealth and strength to the mother country; and will, I trust, for ages hold out a proof that the people who live under a constitutional monarchy enjoy much truer freedom than those who have formed part of any democracy, ancient or modern.

In terminating the preceding sketch of the labours of recent explorations in Australia, I have to express my regret on one point only. I cannot learn that any of the recent travellers have determined the relative altitudes of the tracts they traversed, after the manner pursued by the indefatigable Mitchell in all his surveys. For, whilst I know that Stuart, Landsborough, and McKinlay could not possibly devote sufficient time to any one district they traversed, to delineate all its physical features with the accuracy of the accomplished Mitchell, still with a thermometer only and the boiling water which they had at every camp, approximate heights could easily have been ascertained. If such approximate levels of the country had been registered, our knowledge would have been greatly increased; and our practical geographers would have had the means of laying down on their maps the river systems and drainage of the vast interior.

New Zealand and its Gold.—It is not my province to enter on this occasion into a general review of the progress made in these fine islands in agriculture, mining, trade, and new settlements. I will simply advert to the great stimulus which has recently been imparted to this southern colony by the discovery of gold. As I have no precise information respecting the amount of gold which is yielded in other parts of these colonies, I confine the following few sentences to the auriferous product of Otago. Whilst my friend Dr. Hector has been occupied in tracing out the boundaries of the rock formations of this province, or the Scotch colony, and has been analysing the specimens of earths and ores of the newly-settled parts of it, we learn from the elaborate report of Mr. Vincent Pyke, the Commissioner of the gold-fields, some highly interesting particulars.

* See the Lecture, "Australia: what it is, and what it may be," by Sir Richard G. MacDonnell, C.B., Dublin, 1863.

Although no systematic search for gold was made until 1861, the discovery of the Tuapeka gold-fields attracted workmen and speculators from other parts of the islands, as well as from Australia; so that the revenue of Otago, *mirabile dictu!* was quintupled in one year, having been raised in that short time from 33,500*l.* to 161,744*l.* At the date of this report, 1st October, 1862, we find it stated that, independently of undeveloped tracts, "a continuous gold-field may be said to extend in a general northerly direction from Tokomairivo to the valley of the Upper Clutta, a distance exceeding 100 miles."*

As far as examination of the auriferous region has extended, it would appear that the gold is chiefly found in the younger tertiary deposits, which are made up of the detritus of the subjacent old slaty and quartzose rocks. The latter rarely protrude to the surface in Otago, and do not form, as in Victoria, the visible and striking gold-bearing backbones of the region, into which the miner may penetrate in search of the ore when the gravel, sand, and detrital accumulations shall have been dug out or exhausted. It would appear that, in Otago, these older or original matrices of the gold (my Old Silurian rocks) are much covered up by the tertiary or alluvial accumulations in which the gold is disseminated, and in many parts the hills are covered even to their summits with rich black earth. Hence it follows that, although there may be auriferous detrital matter sufficient to enrich the colony by diggings for many a year, and that the colonists may now only see the beginning of their rich golden harvest, still it would appear that they have not as yet before them the same hopeful prospect of a stout and permanent staple like that of Victoria in the outcrop of the original matrices of the gold-bearing slates, into which they may drive shafts and mines.

Whilst the recent discovery of coal in the western part of Otago is also of much importance to the colony, this region of New Zealand has also become most interesting to the naturalist by the report that the gigantic bird, the Moa,† whose bones excited much interest when so admirably described by Owen, is still living there. In

* See Otago Provincial Gazette, November 26, 1862, No. 217.

† My eminent friend, Mr. John Craufurd, informs me that Moa is the name given in the great Polynesian language to the common fowl in the tropical islands of the Pacific which possess it, and seems to have been bestowed on the gigantic bird by the Maoris when they emigrated to New Zealand. In the Polynesian, the generic term for "bird," manuk, is taken from the Malay, and is found in the dialect of New Zealand.

early days these gigantic birds were masters of the lower, richer, and more accessible regions of these islands. Then came human beings, Maori, from other regions, who killing and eating this noble game, whose bones have been found mixed up with stone knives and other implements, a few survivors found a refuge in the higher, colder, and more sterile tracts of the south. There the persecuted birds might perchance have long remained in solitude, had not the discovery of the precious metal led to a great exodus of miners and speculators, who, having once invaded the wild region, will doubtless soon exterminate the last of the Moas.

Polynesia.—From New Zealand, which was anciently peopled from a part of tropical Polynesia, we may turn for a moment to the clear and animated description of the Fiji Islands, given by Dr. Seemann in his recently published volume, entitled, 'Viti: an Account of a Government Mission to the Vitian or Fijian Islands in the years 1860-61. Acting as botanist and naturalist to the Government expedition under Colonel Smith, which was sent out to inquire into the desirableness or otherwise of colonising these beautiful and fertile islands, Dr. Seemann gives us not only a scientific sketch of their gorgeous vegetation, but also a very lively account of the habits and manners of the natives, a race of the Polynesian negroes, who have only very lately been reclaimed from the cannibalism so strikingly described by Admiral Erskine.*

Africa.—A few weeks only have elapsed since our hearts were oppressed with apprehensions respecting the fate of the Eastern African expedition under Speke and Grant, and by the rumoured death of Consul Petherick, who was *en route* to meet and aid those travellers. I could then scarcely venture to think of touching upon African exploration in my approaching Anniversary Address, so great were my fears respecting the enterprise to which, as geographers, we attached so much importance. Our latest accounts from Speke and Grant had made known to us their position at Kazé, 2° to the south of the Lake Victoria Nyanza on the 30th of September 1861. They had then, after great delays, owing to the infidelity of their porters, who ran off with one-third of their property, just emerged from the wilderness of Mgŭnda M'khalé; while, to complete our depression, a telegram from Alexandria announced that Petherick, after the loss of his stores, had perished in passing to the west of the White Nile. What then was our joy when, after a long and

* 'Cruise among the Islands of the Pacific.'

painful interval of suspense, a first telegram from Alexandria gave us the grateful news that Speke and party had reached Khartûm; while a second, quickly following, bore from Speke to myself the pithy words, "The Nile is settled!" Then came the cheering intelligence that Petherick was not only alive, but had actually joined Speke and Grant at Gondokoro on the 20th of February last; and, finally, we have been furnished with the journal of the travellers, with a map of the region they explored, illustrated by the determination of many points of latitude and longitude in regions hitherto wholly unknown.

Whatever might have been our recent forebodings respecting the success of the explorers from the east and south, who had met with obstacles unknown to Burton and Speke in their former traverse of that central region, I never, on my own part, gave up the hope that, like many a previous African traveller supposed to be dead, Consul Petherick would still be found in life. Owing, however, to his disasters on the White Nile, and the loss of his stores, our agent—who had been liberally supplied with money by us, with a view to succour Speke and Grant when they were struggling to get through a tract where we apprehended that their greatest difficulties would occur—could afford them no important assistance when he joined them at Gondokoro. This is the place, as you will recollect, beyond which the Dutch ladies had reached in their steamer; and had our travellers arrived there some weeks earlier they would, doubtless, have not only been well cared for by these adventurous ladies, but would have been so rapidly carried down by steam to Khartûm that before now we might have had them among us. Real and substantial succour had, however, before Petherick's arrival, been brought to the expedition by that gallant, devoted, and enterprising explorer Mr. Samuel Baker, who, having heard of Petherick's disasters, had fitted out at his own cost a separate expedition, in which he was determined, if he could not relieve our explorers, at all events to try to follow the White Nile to its real sources. Mr. Baker—distinguished formerly by his exploits in Ceylon, and in the preceding season by his researches in the districts north of Abyssinia, also by defining the position and peculiar hydrographical conditions of several affluents of the river Atbara, previously quite misapprehended by geographers—had made up his mind to pass the equator in his southward search after the missing travellers. Pursuing his route to Gondokoro, he was the first to meet the long

absent parties, and to supply them with money, provisions, and boats. The cordial thanks of our Council have necessarily been voted to Mr. Samuel Baker for his noble conduct; and, as he has now gone off to the south-west in the hope of tracing the extent of a lake on the west, laid down by Speke in his map as the Luta Nzigé, and intending to devote a year to this enterprise, we may confidently hope for a satisfactory solution of this collateral question of the source of a great feeder of the White Nile in a higher latitude. Let it also be recollected that Mr. Baker is not merely a daring explorer, a good naturalist, and a first-rate sportsman, but is also a good geographer, having already made, as I learn from a letter addressed to his friend Admiral H. Murray, numerous astronomical observations fixing the positions of rivers and places.

But, whatever may be in store as to future discoveries, let us, in the mean time, dwell with delight on the grand achievement of Speke and Grant, who, by traversing a region never previously explored by civilised man, have solved the problem of ages; and have determined that the great fresh-water lake Victoria Nyanza, whose southern watershed extends to three degrees south of the equator, is the reservoir from which the sacred Bahr-el-Abiad, or White Nile, mainly descends to Gondokoro, and thence by Khartŭm into Egypt.

In tracing the outline of Speke's recent discoveries, I may shortly recapitulate the nature of the problem that was presented to him when he started on the expedition. His previous journey (1858) (at right angles to the route jointly travelled by Burton and himself to the Tanganyika Lake, and undertaken while Burton lay sick at Kazé) led him into a land where small rivulets began to flow northward into a great fresh-water sea, called the Nyanza, of which he fixed the longitude and altitude, as well as the latitude of its southern end. The lake was bounded to the east by the warlike Masai nation, and to the west by the kingdoms of Uzinza and Karagwé, whilst along the northern shore lay Uganda, Usoga, Amara, &c. Speke's furthest point at the southern end of the lake therefore lay, by astronomical observations, about 480 geographical miles south of Gondokoro, the uppermost well-known point on the White Nile, though the exploration of occasional travellers or ivory dealers—as Peney, the brothers Poncet, and mainly De Bono and Miani—had reduced the distance between the nearest points then known to white men to 400 geographical miles. The assertions of travelled Arabs convinced Speke that the outlet of the lake which

gave birth to the White Nile lay far away in the north, between Uganda and Usoga. Speke's present journey was made to ascertain the truth of such information. His main difficulty was presumed to lie in obtaining the goodwill of the powerful chief of Uganda, who was known to be constantly at war with the king of Unyoro, and of such other native potentates as might otherwise block his way; but no great trouble was anticipated in reaching the lake-district a second time.

Our travellers started from the East African coast on the 1st of October, 1860, but the commencement of their journey was most inauspicious. Eastern Africa was parched with drought, and its tribes were at war with the Arabs trading there in ivory. The result was that they did not reach even Kazé without great delays and anxiety, terminating with illness. The next intelligence was dated September 30, 1861, near Kazé, and told a more cheering tale. The travellers were again on the advance, with a sufficient attendance of porters and interpreters, and were hopeful of success. More than a year then ensued without a particle of news, owing to the wars alluded to, when the joyful information, already alluded to, reached England by telegram. There is a short break in our knowledge of their proceedings in the mean time; for Speke sent a despatch by way of Zanzibar, which has never reached the Society. His present reports contain a consecutive narrative of the last and principal part of his journey between Karagwé and Gondokoro. Grant having been left behind sick, Speke commenced on January 1, 1862, his departure from the capital of a kingdom called Karagwé, that abuts by one of its corners against the west shore of Nyanza, at its southern end. Here he seems to have made a most favourable impression on the intelligent King Rŭmanika, who gave him friendly recommendations to the powerful King of Uganda. Karagwé is a portion of a peculiarly interesting district. It occupies a shoulder of the eastern watershed of a territory 200 miles broad, and some 6000 feet above the sea-level, studded with detached conical hills, one of which attains the height of 10,000 feet at least.

Two sources of the Nile rise in this territory—namely, the Kitangŭlé River, which is the chief feeder of the Nyanza Lake, and probably that of another Lake, the Luta Nzigé. So, probably, also does the source of the Shirè of Livingstone, if we may believe the reports now brought to us by Speke; for it is believed that the Tanganyika Lake is emptied, and not supplied, by a river at its southern end, and that this affluent feeds the Nyassa Lake, and through it,

of course, the Shirè. The northern feeder of the Tanganyika is supposed to take its rise in the land of which we have been speaking.

It is evident, from a part of the present reports, that the missing papers would have enlarged on the fact that in Karagwé, Speke found himself in contact with a superior caste, strongly and favourably contrasting with the negro tribes he had previously seen, and that Uganda, whither Speke now went, was ruled over by a similar race. Their country lies along the Nyanza, and occupies a full half of both its western and its northern shores. The parent stream of the Nile bounds Uganda on the east, as it issues from the middle of the northern boundary of the lake with a stream 150 yards in width, leaping over a fall of 12 feet in height. The Nyanza is said to have other outlets from the same shore, which all converge upon the Nile, and feed it at various points of its course extending to a distance of 150 miles from the lake. The north shore of the Nyanza is parallel to the equator, and about 20 miles north of it.

Our traveller conceives the lake to have formerly extended over a greater area than at present. Its banks are intersected at frequent intervals by streams which he calls "rush-drains," apparently small half-stagnant watercourses, which drain that portion of the adjacent land which he believes to have been formerly flooded by the lake. The present size of the Nyanza is considerable; it is about 150 miles in length and breadth, but it appears to have no great depth.

Speke further learnt that other lakes have a share in feeding the Nile. One of them, Baringa, lies immediately to the east, connected by a strait with the Nyanza. It supplies the Asŭa River, which runs into the Nile just above Gondokoro. The other is the Luta Nzigé, to which we have already alluded, and which Mr. Baker was to proceed to examine. Captain Speke never saw it, but pictures it on his map as being annexed to the Nile. The river enters it, after making a great bend, at the easternmost part of its northern shoulder, and re-issuing at the westernmost part of the same locality. This lake lies 120 miles north-west of the northernmost part of of Nyanza.

The people of Uganda are described as "the French" of these parts, from their sprightliness and good taste in behaviour, dress, and houses. Their ruler, who is absolute in his power, fortunately showed great kindness and even affection for Speke. He knew confusedly of the navigation of the White Nile by white men, and had occasionally received their goods in form of presents brought by the northern negroes. He was exceedingly anxious for the establish-

ment of a trading route to Gondokoro, but northern tribes blocked the way.

Speke was detained five months at Uganda whilst waiting for Grant's arrival, owing to the attachment this youthful king formed for his white visitor, who taught his majesty the art of shooting and various other accomplishments, and thus gained much influence at the sable court: his movements were narrowly constrained, to satisfy the king; but he finally gained the ever-doubtful passage to the north, and thence he was passed on to the next kingdom, that of Unyoro, still inhabited and ruled over by the same peculiar Wahuma race, but by a far less advanced portion of them. North of Unyoro the South African family of languages, which had been universal thus far, suddenly ceased to be used, and the northern dialects took its place.

Hitherto Speke had had no trouble about interpreters; for one tongue was understood more or less by persons in every kingdom he passed through. Henceforth he could not advance without Unyoro interpreters. The people, too, were far more barbarous. He saw strangers among them who lived, when at home, in absolute nudity. At Unyoro they adopted a scanty dress, out of deference to the customs of the Wahuma. The procrastination of the King Kamrasi, and the troubles of the travellers when they were getting to the end of their journey, were most annoying; the barbarian succeeding in taking from them their only remaining chronometer. They contrived, however, to escape and to follow the Nile for 120 miles north of the great lake, or to lat. 2° N. There the river falls rapidly and makes its great bend to the west, to pass through the Luta Nzigé Lake, and Speke was obliged to travel along the chord of the bend, a distance of 70 miles. They again struck the river at De Bono's ivory station, in lat. 3° 10′ 37″, and found they had descended 1000 feet.

A large body of Turks (ivory traders) were the only occupants of the station when the travellers arrived, and they welcomed them cordially. After some days, the camp broke up, and they all marched to Gondokoro. They passed, in north latitude 3° 35′, the tree on which the Venetian Miani had cut his name to mark the extreme point to which that traveller had penetrated. The Turks compelled the Bari natives to contribute porters; and I am sorry to add that the narrative fully confirms the universal accounts of the inhuman treatment of the natives by these Turkish traders. Our travellers reached Gondokoro on the 15th of February, and there met Mr. Baker.

In his retrospect of the more civilised countries he had visited, namely, the three kingdoms of Karagwé, Uganda, and Unyoro, Speke unhesitatingly gives the preference to the first-named, inasmuch as the King Rumanika is described as a person of character and intelligence. M'tese, the sovereign of Uganda, is an amiable youth, surrounded by his wives, and delighting in field sports; while one of the rules of his court would seem to require the execution on an average of one man per diem for the good of the State. The northernmost of these three kings, to the north of whose dominions language wholly changes, is described as a morose, suspicious, churlish creature, yclept Kamrasi, whose chief occupation was the fattening of his wives and children till they could not stand, and in the practising of witchcraft. Our travellers spent a whole year in getting through these three kingdoms, in no one of which had a white man ever been seen before; nor would our friends, in all probability, ever have escaped from the royal clutches had they not supplied their majesties with numerous presents, and had not the kings eagerly desired to open a traffic with the whites.

The question of the sources of the Nile has occupied geographers and travellers from the remotest periods of history; and when we come down to the period of the Romans, we learn from Seneca that Nero sent up two centurions to settle it, but the Roman captains returned without accomplishing what our two countrymen have effected. Lucan, indeed, in his 'Pharsalia' makes Julius Cæsar speak thus at the feast of Cleopatra :—

> "Sed cum tanta meo vivat sub pectore virtus,
> Tantus amor veri, nihil est quod noscere malim
> Quam Fluvii causas per secula tanta latentes,
> Ignotumque caput: spes fit mihi certa videndi
> Niliacos fontes; bellum civile relinquam."

It is not, therefore, for us only as geographers to rejoice on this occasion; but our country should be proud of such a feat as has been achieved by the two gallant officers of the Indian army; and I have no doubt that when the recitals of their toils and journeys are made known, as well as their graphic description of interior native kingdoms of whose names we never heard, they will be greeted with the same approbation of the public as that which was so justly bestowed on my valued friend Livingstone after he had traversed Southern Africa. Let us hope that Speke and Grant may reach these shores before the last day of meeting, on the 8th of June; but should this not occur, the Council of the Society

have already authorised me to call a special meeting, in order that we may gratify the public, and do honour to ourselves, by having their precious discoveries communicated to the Society by the authors in person.

In the mean time it is highly gratifying to know that our Authorities at home have been prompt in offering to these distinguished men every requisite succour. Earl Russell, with the same alacrity as when he assisted Lieutenant (now Captain) Pim to traverse Siberia in search of Franklin, has transmitted a sum of money in aid to Alexandria. The Oriental and Peninsular Company have liberally granted a free passage to Aden or Bombay to the twenty-three black attendants of the explorers; for without such assistance the poor creatures could never have reached their homes near Zanzibar. Again, the Secretary and Council of India have, at our request, at once extended the leaves of absence, with Indian pay, of Captains Speke and Grant to the 1st of July, 1864, in order to free them from embarrassment, and enable them to publish full accounts of their researches. In communicating this circumstance, and in authorising me to send the news by telegram to Alexandria, our Associate, Mr. Under-Secretary Merivale, thus writes: "I wish the telegraph could also conveniently carry the expression of our Indian satisfaction at the great achievement which these officers have performed, and our pride that we, the Indian Service, have beaten Julius Cæsar." I may here state, that the telegram I sent to Alexandria on Thursday was answered on Saturday by Mr. Saunders, Her Majesty's Consul at Alexandria, in these pithy words:—"Speke and Grant reached Thebes and Kineh.—Telegram of Leaves just received here." As, therefore, our travellers are now far below the Cataracts, and in steamers of the Viceroy, we may very soon welcome them at home.

When the full narrative of this expedition is laid before the public, you will then have to peruse a most graphic, and in many parts an amusing account of the customs and habits of various peoples of whom we never heard before, and of the character and power of kings, to traverse whose dominions required such a continual exertion of tact, vigilance, and resolution, as have proved the leader of the expedition to be as good a diplomatist as he is a gallant soldier. Looking at Speke only as a practical geographer, we of this Society owe deep obligations to him. For he has determined by astronomical observations the latitude and longitude of all the important sites which he visited; and, in transmitting these to us, accom-

panied by a variety of meteorological data, has expressed a wish that these should, if possible, be calculated and compared by competent authorities before he reaches England, and before his map is published. On this point, I am happy to say, that Mr. Airy, the Astronomer Royal, has, with his well-known love of our science, undertaken the important task.

When delayed in the interior, Captain Speke occupied his leisure hours by writing a history of the Wahuma, otherwise (as he believes) Gallas, particularly in reference to the portion of that nation that crossed the Nile and founded the large kingdom Kittara, which is bounded on the south by the Lake Victoria Nyanza, and its affluent the Kitangŭlé Kagera; on the east by the Nile; on the north by the river-lake Luta Nzigé; and on the west by the kingdoms of Utumbi and Nkole. These names, as well as those of the kingdoms of Karagwé, Uganda, and Unyoro, were only made known to geographers by hearsay from Arab merchants in Speke's first journey; while no historian has heretofore heard of the dynasties which Speke enumerates, among whose kings we read of Ware the 7th and Rohinda the 6th, while one of the descendants of these sovereigns is at present found possessed of from 300 to 400 wives.

Not wishing, however, to do more on the present occasion than to stimulate your desire to listen to a fuller narrative at a future meeting, I must be permitted to read the very words of Speke, when, at the end of the long pilgrimage of himself and his companion, he fell in at Gondokoro, on the 15th February last, with Mr. Samuel Baker, who was travelling onwards to assist him. "The meeting," says he, "of two old friends suddenly approaching one another from opposite hemispheres, without the slightest warning, can be better understood than described: we were intoxicated with joy, though my good friend had inwardly hoped till now to find us in some fix from which he might have relieved us. Baker had one *dyabia* and two smaller vessels, stored with corn, which he at once placed at our disposal. He also lent me money to pay the way to Cairo, and finally supplied our *dyabia* with many little delicacies for our comfort. He was our saviour, if not in the interior, at any rate on the Nile." Nor can I here omit to notice the paragraph in Speke's first letter to myself, in which he says, "I may safely say I never felt so rejoiced as when Petherick delivered your letter announcing that the Royal Geographical Society had awarded to me the Founder's Medal."

The determination of the reservoir from which the Nile flows will enable us to speculate with more certainty than before on the regular periodicity of the rise of this stream in Egypt; and which is now generally attributed, not to the melting of the snows of the higher chain to the east, but, in far the greater part, to the fall of the equatorial rains on the interior spongy upper basins, which, when supersaturated, must fill to overflowing the lakes into which the waters pass, the periodicity being determined by the passage of the sun over the equator. And here I cannot but observe that if there be any persons who adhere to the old-fashioned erroneous belief that the interior of Africa is a mountainous sandy desert, from which the sources of the Nile are derived, the discoveries of Burton and Speke, and of Speke and Grant have as completely dispelled the illusion respecting the equatorial latitudes, as the journey of Livingstone put an end to a similar false hypothesis in the southern part of this great continent.

Modern discovery has indeed proved the truth of the hypothesis, which I ventured to throw out to you eleven years ago, that the true centre of Southern Africa is a great elevated watery basin, often abounding in rich lands; its large lakes being fed by numerous streams from adjacent ridges, and its waters escaping to the sea by fissures and depressions in the higher surrounding lands. It was at our anniversary of 1852,* when many *data* that have since been accumulated were unknown to us, that, in my comparative view of Africa in primeval and modern times, I was led to suggest that the interior of that continent would be found to be such an unequally elevated basin, occupied now, as it was in ancient geological periods, by fresh-water lakes, the outflow of which would be to the east and to the west, through fissures in subtending ranges of higher mountains near the coast. While this theory was clearly verified in Southern Africa by Livingstone in the escape of the Zambesi, and is well known to be true in the passage of the Niger, through deep rocky gorges, so does it apply to the Nile, in as far as the great central lake, Victoria Nyanza, is ascertained to occupy a lofty plateau 3,500 feet above the sea. Again, as the southern end of this lake extends to the water-parting between North and South Africa, and in its range northwards is only fed by small lateral affluents flowing from the flanking higher grounds, so the waters issuing from the northern end of the Lake Victoria Nyanza, and, forming the White

* President's Anniversary Address 1852, vol. xxii., p. cxxi.

Nile, take advantage of a series of depressions, through which they descend in a succession of cascades. The uppermost of these cascades, close to the lake, has been named, after my predecessor (now Earl de Grey and Ripon), "The Ripon Falls." Thenceforward, the White Nile, fed by other affluents as it flows to the North, has a descent of 2,400 feet, when it reaches Khartŭm, which is itself 1,100 feet above the sea. The general course of the Nile, from south to north, and its peculiarity as a stream, in having no affluent between the Atbara River and the sea, a distance of 1,700 miles, has been in the first instance dwelt upon by the great Abyssinian traveller, Bruce, and has since been ably illustrated by Sir Henry Holland.* The phenomenon of its being confined to this northward course is due to the fact, that the flanking higher grounds, ranging from south to north, do not afford, as in Southern Africa, lateral valleys which lead to the sea. The other generalizations which have been established by Speke and Grant, independently of the true source of the White Nile, are—

1. That the hypothetical mountain-chain, which has been called the "Mountains of the Moon," and which on old maps has been represented as traversing the equatorial regions of Africa from east to west, exhibits no such range. According to Speke, the only high land seen was simply a separate interior cluster of hills, from which descend some small western feeders of the Lake Victoria Nyanza. In fact, these mountains seem to occupy the higher part of the central watershed between North and South Africa. Now, as they supply the Victoria Nyanza, and, consequently, the Nile, with some of its western waters, they may also send eastern contributions to the river Congo. To the south there seems little doubt indeed but that their waters flowed into the Lake Tanganyika of Burton and Speke, and thence into the Nyassa of Livingstone, as had been, indeed, inferred, on what seems to me sound reasons, by Mr. Francis Galton.†

2. That the inhabitants of the kingdoms of Karagwé and Uganda, in the central and equatorial parts of Africa, are much more civilized and advanced than the people who live to the north, on the banks of the Nile, between the Lake Victoria Nyanza and Gondokoro, the latter being for the most part those naked barbarians, probably the

* Edinburgh Review, Oct., 1854. Alluding to the mysterious unsolved problem as to the true origin of the Nile, Sir H. Holland then justly said, that "the man who makes the discovery will perpetuate his name to all future time."

† See Earl de Grey and Ripon's Anniversary Address, 1860, p. clx., "Africa."

anthropophagi of Herodotus, who have doubtless been the real impediments during all ages to explorations up the stream, or from north to south.

3. We learn that some acquaintance with the language of the natives on the east coast enabled the travellers to hold converse with many individuals in all the tribes and nations they passed through until they reached the above-mentioned northern barbarians, whose language is quite distinct from any dialect of Southern Africa.

4. From the notes of Speke on the geological structure of the countries he passed through, I infer there is little or no hope of any portion of those regions proving to be auriferous. I direct attention to this fact; since an erroneous notion has crept into the public mind, derived probably from the possibly gold-bearing character of some mountains extending southwards from Abyssinia, that a gold region existed near the sources of the Nile.

In this Address I cannot pretend to do justice to the writers from the early days of Herodotus to the later period of Ptolemy, as well as to many modern authors who, referring to those ancient works, or obtaining information from natives, have assigned the origin of the Nile to lakes in the interior of Africa.* We are told by Cooley, in his 'Geography of the Great Lake of Southern Africa,'† "that above three centuries have elapsed since accounts of a great sea in the interior of Africa reached the Portuguese settlements on both sides of that continent." It is probable that from this information was constructed the old map of the sixteenth century, which exists in the library of the "Propaganda Fede," in Rome, and in which the Nile is represented as issuing from an equatorial lake.‡ Already in 1518, adds Cooley, we find it stated as a fact, learned from the natives of Congo, that the River Zaire rises in a lake in the interior, from which issues in another direction another great

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* Colonel Sir Henry James informs me that in Lelewel's 'Géographie du Moyen Age' (Brussels, 1830), there is a map taken from the Arabian work called 'Rasm,' which map was copied by Abu Diafar Mohammed Ben Musa, A.D. 833, by order of the Calif Almamoun. This map is therefore upwards of 1000 years old; and on it the source of the Nile is represented as being in a lake called "Kura Kavar," situated on the Equator, an island in it being represented as in longitude 32° 40′ E. This agreement to so great an extent with modern discovery is truly remarkable.

† Journal of the Royal Geographical Society, vol. xv., p. 185.

‡ A small copy of this large map taken by Lieut.-Gen. Jochmus von Catignola is in our Apartments. In a letter from Rome, dated July 3rd, Monsignor F. Nardi, Prelate of the Pope's Household, informs me that this fine and large old map was constructed by one Jerome Verrazano, probably a brother of the celebrated Florentine geographer John Verrazano, who was sent out by Francis I., King of France, to explore a part of North America.

river, presumed at that time to be the Nile.* Again we learn from the same learned, critical geographer, that De Barros tells us of the great lake in the centre of Africa, "whence issue the Nile, the Zaire, and the great river, the branches of which encompass Benomotopa, besides many others that are nameless." † Such information, gleaned from native sources, it has been reserved to our times to verify or disprove by actual observation. The one or more great lakes of the old authors have now been separated by explorers into several great water-systems; and it is to that of the White Nile, as fed by the great reservoir of the Lake Victoria Nyanza, that our present attention is called.

And here we must give due credit to our Abyssinian medallist, Dr. Beke, who, in the year 1848, threw out an original hypothesis ‡ respecting the sources of the Nile, which the journey of Speke and Grant has proved to be substantially correct; § and on which he has dilated at the meetings of our Society, and in letters to myself.

It is not my province to enter now into a general discussion on the relative merits of the writings and maps of critical geographers upon Africa, nor to endeavour to show how in the south-east the recent observations of Livingstone may have substantiated or modified the ingenious views of Cooley, the practical sagacity of Arrowsmith, or the laborious analyses of Macqueen. The source of the White Nile is the question before us, and on that point we know that, when (1858) he was associated with Burton, Speke discovered and named the great Lake Victoria Nyanza. Nay, more, he assured

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* Fernando de Enciso, Suma de Geografia.

† Asia, Decad., l. xi.

‡ Transactions of the Sections of the Brit. Association, 1848, p. 63.

§ In this Address, delivered on the 25th May, which, hastily written, was printed in the *Times* of the following day, there are *errata*, particularly in reference to the writings of Mr. Cooley and Dr. Beke, which I have endeavoured to correct in the text. As respects Africa, my main object was to convey a clear and popular view of the journey of Speke and Grant. I am aware that various opinions prevail among sound critics on the geography of the interior of Africa; and I profess to be wholly incompetent to side with Cooley, Lacerda, and Pigafetta, or Burton, on the one hand, or with Macqueen or the other African authorities, such as Beke, Erhardt, Speke, &c., on the other. On the following points of comparative geography, however, I must do Mr. Cooley the justice to say, that he has satisfied scholars that the Blue Nile was *the* Nile of the ancients (though we now know that it is merely an affluent of the much greater White Nile)—that Greek geography can be traced with certainty to Palta on the east coast of Africa, and, as stated in the text, that the Mountains of the Moon do not belong to the genuine text of Ptolemy. (See Dr. Smith's Ancient Geography). Though unprepared myself to go into the relative merits of our African critical geographers (not forgetting the Inner Africa of Cooley and his original Map, the Memoirs and Maps of Macqueen, Beke, and others), I should wish to see clear abstracts of their writings placed before us in a future Number of our Proceedings; for such a repertory would be highly interesting, and also useful to practical geographers and explorers.

us, in 1859, when he determined its position, that it would prove to be the true source of the Nile; and that problem of ages he has striven to settle by personal survey. For all the speculations of geographers as to the main source of the Nile remained to be confirmed or set aside by actual observation.

As to the "Mountains of the Moon," they are, according to Cooley, an Arab interpolation, and do not belong to the genuine text of Ptolemy, Amedi, &c. Amid the mountains of tropical Africa, we may hesitate to apply that designation with Burton to the group which Speke views as such, *i. e.*, w.s.w. of the Lake Victoria Nyanza; or, on the other hand, to agree with Dr. Beke in considering as such a north and south chain on the east, which, as he supposes, may unite the lofty peaks of Kilimanjaro and Kenia with mountains in Abyssinia. Even those two views need not exhaust this prolific subject of theory; while they and other speculations may serve geographers a good turn as useful stimuli to future explorers.

In dwelling on the fact that all efforts to ascend the Nile to its source have failed, I must do justice to those geographers who have shown the way as to the desirableness of exploring the interior of Africa from the coast near Zanzibar and Mombas. First, I have to record that in the Session of 1838-9, Captain W. Turner, R.N., suggested to our associate Mr. W. Bollaert and the late Captain Ormsby of the Indian Navy, that the three should go to Zanzibar, thence to explore the country to the great lakes then called *Maravi*. Their plans were submitted to Mr. Cooley, who even wrote out a list of instructions, whilst the Royal Geographical Society as well as the Government offered assistance. This expedition was put an end to by the employment of both the naval officers; and Mr. Bollaert most unwillingly relinquished the project, and went to Texas to explore portions of a country, the regions to the south of which he has since so well described. Next we have to bear in mind the efforts of those enterprising German missionaries, Krapf and Rebmann, who, advancing from Mombas to the foot of the great mountain Kilimandjaro, announced the startling phenomenon that these very lofty mountains, though under the equator, were capped by snow. The truth of this observation has since been completely realised by the very remarkable actual survey of Baron C. von Decken when accompanied by the able geologist Mr. R. Thornton, as well as by subsequent ascents by the former to the height of 13,000 feet. Then Erhardt read a memoir before our Society, illustrated by a map compiled by himself and Rebmann, of a vast tract of Eastern Africa. It was

based on numerous caravan routes and included an enormous lake stretching from the Equator down to the lake Maravi. Next, our associate Colonel Sykes earnestly advocated the operating from Zanzibar,* as an excellent base for all geographical researches in the adjacent continent. I must further state that, as early as 1848, Dr. Beke projected an expedition to the Zanzibar coast, of which Dr. Bialoblotsky was to be the leader. As great prejudices then existed against these suggestions, on account of the supposed inevitable loss of life to any European who should sojourn there, the more have we to thank those of our associates who advocated a line of research, which has led first to the expedition of Burton and Speke, and eventually to the actual discovery of the source of the true White Nile.

I may also say, with no small pride, that from first to last the Council of this Society has vigorously sustained African expeditions, whether in southern or northern latitudes; and I am well entitled to state that in the absence of our persistent representations to Her Majesty's Government, for whose support and countenance we are indeed deeply grateful, the discoveries of Livingstone, and of Burton and Speke, and the great recent discovery of Speke and Grant, which now occupies our thoughts, would not have been brought about in our day.

The introduction of a small steam-vessel on the waters of the White Nile has enabled a party of lady-tourists to effect its navigation, with an ease that astonishes those who had experienced the grievances of the usual means of transport. Not only was the time of passage reduced to a small fraction of its former amount, but the rapid and independent movements of the steamer withdrew her passengers from the risk of those native hostilities which had become a serious danger to the navigators of the White Nile. At the same time that Mr. Baker, warned by the universal experience of the ivory-traders and previous travellers, had pointed out the necessity of a powerful escort to secure ordinary safety, the three ladies, Madame Tinné and her daughter, and her sister Madame van Capellen, steamed in their little vessel to Gondokoro, and beyond it, with a scarcely more numerous attendance than would have assured their personal comfort in the most civilized parts of Egypt.

The energy of these ladies, the daughters of the celebrated Dutch Admiral van Capellen, the coadjutor of Lord Exmouth at Algiers,

* See Journal of the Royal Geographical Society, vol. xxiii. p. 101.

induced them to extend their voyage up the Sobàt, which they describe as a river of importance only during the period of high waters. We had previously been gratified with their lively accounts of the country even to the south of Gondokoro; and we have recently heard of their making a new expedition from Khartŭm to the Bahr el Ghazel, in the hopes of penetrating some of the affluents of that great mere. They were at the same time doing an additional service to geographers by conveying the exploring party of Dr. Heuglin to their point of departure from the shores of the same lake. I have twice called the attention of the Society to the exploits of these ladies, the youngest of whom, Miss Alexine, is a naturalized Englishwoman: I will only repeat what I have said at one of our Evening Meetings, that they well deserve to be honoured in an especial manner by the Royal Geographical Society. Dr. Heuglin has already thrown great light on the geography, in its widest sense, of the northern parts of Abyssinia; and the linguistic studies of his original colleague Dr. Munziger have resulted in the collection of eight new vocabularies.

Little is known with certainty of the result of Von Beurmann's endeavour to penetrate Wadai. He appears to have reached Lake Tsád, and there to have awaited permission to proceed. Further rumours have reached Bengazi; but intelligence of a definite character is anxiously waited for.

M. Jules Gérard has sailed to the West Coast of Africa with the object of penetrating Dahomey and Ashanti, and of making such further explorations as opportunity may admit, by passing through the interior to Sierra Leone. The Council of this Society have encouraged his strongly-expressed desire to collect geographical information by the loan of a small but serviceable outfit of instruments. They have also furnished him with instructions in respect to the routes by which, in their opinion, he might most profitably travel, but have in no wise become responsible for the expenses of his expedition.

M. Paul du Chaillu has announced his immediate intention of again starting for the Gaboon, now adequately prepared to map his future journeys; and I confidently hope that by the study he has recently gone through, he will be enabled to make accurate astronomical observations, and add materially to the value of his published work which has so much interested the public of England, France, and America. I must add that M. du Chaillu having freighted a ship at his own cost, and having provided himself

with all the requisite instruments and stores, has expended in this generous effort nearly all the money he obtained from the sale of his work, and has therefore our warmest good wishes.

The Baron C. von Decken had again started, and again been foiled in penetrating the interior of Africa by the way of Mombas. The territory of the Masai appears to be absolutely closed to strangers, at least in that direction. The Baron, as before stated, ascended Kilimandjaro to a height of 13,000 feet, where he witnessed a fall of snow, the first that has been seen by any white man, rarely even by a black one, in tropical Africa.*

In general African geography, maps of the whole of the continent, introducing recent discoveries, have been published by Mr. Arrowsmith, and also by M. Ravenstein. The large sheets of Dr. Petermann are all issued, with the exception of those that unite the Lake Nyanza and Gondokoro, which have awaited the results of Speke's expedition. The scale of these charts of Dr. Petermann is sufficient to admit of the insertion of numerous geographical notes and references, whereby it becomes a valuable index to the authorities whence it has been compiled, in addition to its merits as an ordinary map.

Dr. Barth's valuable vocabularies, to which attention was drawn in the last Anniversary Address, are on the point of completion. That able and energetic geographer, who now worthily fills the chair of the Berlin Geographical Society, has published a great

* After the Anniversary Meeting I received a letter from Baron C. von Decken written in the Seychelles Islands, and dated May 12, 1863. This most enterprising Hanoverian traveller was then on his way to Madagascar with the intention of returning to Zanzibar and Mombas, to continue his explorations in Eastern Africa. The object of his letter was to obtain from the British Government some efficient countenance, and a little assistance from our ships of war; inasmuch as the Sultan has been inimical to all his efforts. It appears that Baron von Decken is procuring a steamer of his own, in which he proposes to ascend the river Juba if he can once get his vessel over its dangerous bar. In his last journey Baron C. von Decken was prevented from traversing the Massai country and reaching the northern snowy mountains (Kenia) by that route, and he now intends to ascend one of the rivers which fall into Formosa Bay, *i. e.* the Dana, Osi, or Sabalki, and the Juba. If he is enabled to proceed 100 or 150 miles up any one of these rivers, he hopes to succeed not only in reaching the Kenia Mountain but also the Lake Baringo and other interesting points. Our German cotemporaries may well be proud of this noble and devoted explorer, who, they may be quite sure, will have the heartiest support of the Royal Geographical Society and its President, and, as I can now add, of Her Majesty's Government. This enterprise of Baron von Decken will, if successful, throw a clear light on the relations of all the eastern affluents of the Victoria Nyanza and White Nile, of which Speke has brought us home knowledge as derived from the natives. In the mean time, Captain Speke is decidedly of opinion that the Kilimandjaro snowy peak is separated from the Victoria Nyanza by salt lakes and plains, and throws off its chief waters to the east by the Pangani River. The Kenia snowy northern peak may, however, he thinks, contribute water to the Lake Baringa, and thence by a channel may swell the Nile at the north end of the Lake Victoria Nyanza.—*July* 1*st*, 1863.

mass of information, in a compendious tabular form, which bears on the periods of rise and fall of the rivers of North Africa, and the corresponding state of the rains and winds. The subject is of interest, partly because the means of intercommunication among the natives and their daily pursuits are largely dependent on the condition of their rivers, but mainly owing to the fact of its offering some acceptable glimpses into the hydrology of little known regions.

LIVINGSTONE.—The proofs obtained by Livingstone that the Rovuma was too shallow a stream to be used in commerce were communicated by my predecessor; and a second expedition to that river enabled the indefatigable traveller to ascend that stream in a boat, and ascertain that it has its source in high lands, and not, as was at one time imagined, in the northern end of the great Lake Nyassa.

After his visit to the Shirè River, and his return to the Zambesi, Livingstone had the happiness of being joined by his devoted wife, after an absence of four years; but in three months, alas! she followed the fate of the good Bishop Mackenzie and his Archdeacon. The touching letter of my friend to myself on this bereavement, and which was read before the British Association at Cambridge, in September last, must have deeply affected all those who knew, as I did, how devotedly the great traveller was attached to that excellent woman.

The extraordinary efforts made by Livingstone to get his boat up the tract watered by those falls of the Shirè which he named after myself, followed by his extraordinary labours and courage in ascending that river and the Lake Nyassa, and his subsequent unwearied labours to transport his small steamer in pieces up the banks of the Shirè, where that river descends in cataracts to the Zambesi, as well as the devoted energy of the pious Bishop Mackenzie and his reverend associates, are all to be recorded as proofs of the heroic resolution of our countrymen.

I had, however, been for some time aware that both the Zambesi and its affluent the Shirè were localities little fitted for the stations of Christian pastors, from whence religion might be successfully extended. Whilst the malaria on the banks of the Zambesi renders any residence on them most dangerous, the evidences obtained by Livingstone and his brother Charles, were, that although the higher country up the Shirè was healthier, yet that the various tribes of the inhabitants were continually at war with each other,

a fact of which sacked villages and the frequent bones of the victims of war were the too palpable evidence. Alas! we also know too well that, in the very first efforts to select missionary stations, that excellent man Bishop Mackenzie found himself compelled to side with one tribe against another, and to be thus engaged in actual warfare! Again, I learned with sorrow, that, in Livingstone's efforts to suppress the slave-trade, in the interior, he had been grievously thwarted by the underhand conduct of certain slave-traders, who followed him into tracts which he had opened out, transporting as slaves many unfortunate natives.

Seeing that all these operations, whether missionary or philanthropic, must be carried on by acting from a base where no British colony exists whence real support could be derived, and also referring to the untoward circumstances to which I have adverted, I was quite prepared to learn that Her Majesty's Secretary for Foreign Affairs should have put an end to a Consulate the main object of which was to suppress the slave-trade. However, therefore, we may regret the withdrawal of our energetic Medallist from the scene of his successes, and before the complete exploration of the Nyassa has been accomplished, we who are sincerely attached to him may rejoice in the prospect of welcoming him on his return to Britain, after making such vast additions to our acquaintance with the geography of Central and Eastern Africa—additions which, without his sagacity and indomitable energy and endurance, might not have been obtained in our day.*

CONCLUSION.

In concluding this Address, I must advert to the changes which take place among our Officers at this Anniversary.

The bad state of health of my distinguished friend General Portlock has, I regret to say, necessitated his retirement from the office

* In reference to what is said above on the subject of Livingstone's explorations, I learn by a letter recently received from him that, instead of returning home, my indefatigable and truth-loving friend has determined to re-ascend the Shirê, and work out the problem of the true source of that stream and his great Nyassa Lake. The British public ought, however, to be informed that in his anxiety to extend his researches—and by so doing check the slave-trade as carried on across the Shirê—Livingstone had expended 6000*l.* of the earnings derived from the sale of his work, in the purchase of a small steamer, intended to navigate that stream. Now, as that sum was of great importance to his motherless children, I earnestly hope that he may be reimbursed, at all events to some extent; the more so as the Consulate, from which he derived only 500*l.* per annum, is at an end. My forebodings as to the helpless state of the University Mission on the Shirê have, alas! been but too fully realized.—July 22, 1863.

of Vice-President. Through the resignation of the post of Honorary Secretary by Mr. Francis Galton, we lose the official duties of a sound geographer, who obtained one of our Gold Medals for his travels in the south of Africa, and who of late has been the able unsalaried Editor of our Proceedings. Though out of office, I venture to hope that he will continue to give us his aid and advice in the Council, particularly as he is the only person in the list proposed who is personally acquainted with the geography of Africa.

In the retirement of the Acting Secretary, Dr. Norton Shaw, the Society is deprived of the services of a zealous and efficient administrator; and the Council have therefore taken the opportunity of marking their sense of the value of his long services in the manner recorded in the Report which has been read to you. I must further do justice to Dr. Shaw by reminding you that, when he was first placed in office, our Members were under 700, and that at present they are about 1800. As I have also taken my share in endeavouring to swell these numbers, and in spreading the reputation of the Society, so am I bound to add that, on every occasion when the sympathies of the public were to be united with our own in any good cause which the Fellows of the Geographical Society had espoused, the energy of Dr. Shaw was conspicuous. Thus, I may particularly cite two Meetings over which I presided. The first of these was the gathering which was called to raise a fund to honour the memory of the gallant French officer Bellot, who was lost in the search after Franklin; the other, the organisation of the great festival given to my dear friend Livingstone on his last departure for Africa. The marked success of both these Meetings was unquestionably due in great measure to the heartiness with which Dr. Shaw urged each project. Again, as the Editor of the Volumes of our Journal and of our Proceedings during many years, he has for a long time been identified with the reputation which our publications have obtained. On these various grounds, therefore, I only do justice to the retiring Acting Secretary, in saying that for such essential services he has obtained our cordial thanks.

In reorganising the Administrative Officers of the Society on a new basis, the Council has deemed it desirable for the permanent advancement of our scientific reputation, that we should follow the system which has been found to work best in the Royal, Linnæan, Geological, and other scientific Societies. The essential change made is, that the two so-called Honorary Secretaries are henceforward to resume the titles of Secretaries (as was the case for many

years after our foundation), and are to act as the efficient Executive Officers, who, under the President and Council, shall transact all the scientific and other business of the Society. On this head I feel quite confident, if Mr. W. Spottiswoode and Mr. R. Clements Markham be, as the Council have suggested, elected to fill these posts, that our best anticipations will be effectively carried out. Under them, the Assistant Secretary will have to perform parts only (and quite enough for any one man) of the numerous avocations of Dr. Norton Shaw; his principal duties will be those of Editor of all the publications, and superintendent of the Assistants and subordinate officers of the establishment.

Finally, let me say that, if I am enabled to conduct your affairs during the ensuing year, I trust that I shall, at its close, be able to announce to you, that there has been no diminution of the prosperity to which we have attained. I must, however, add that the term of my two years of Presidency will then have been completed. And, when I remind you that, if I live till the next Anniversary, I shall have acted as your President for nine years—and that on many other occasions I have also been seated in this chair to do the duty of your absent Presidents—I know that, however great my shortcomings may have been, you will admit that I have zealously served you; whilst I can truly assure you that this service has been a source of the deepest gratification to myself, since I have invariably met with your hearty support.

The capabilities, however, of doing effective service have their limits in the life of any man; and you must not think of changing your rule of biennial Presidencies in my favour, as some of my kind friends have suggested; for I feel that I cannot in a future year undertake, in addition to official and other occupations, this most honourable duty.

Pray, therefore, look to the coming year when I must take leave of you in the capacity of a President, and select some one as my successor, who shall be worthy of the high distinction of presiding over you,—one who will value this privilege as I do,—and who will strive, as I have striven, to promote the interests and advancement of the Royal Geographical Society.